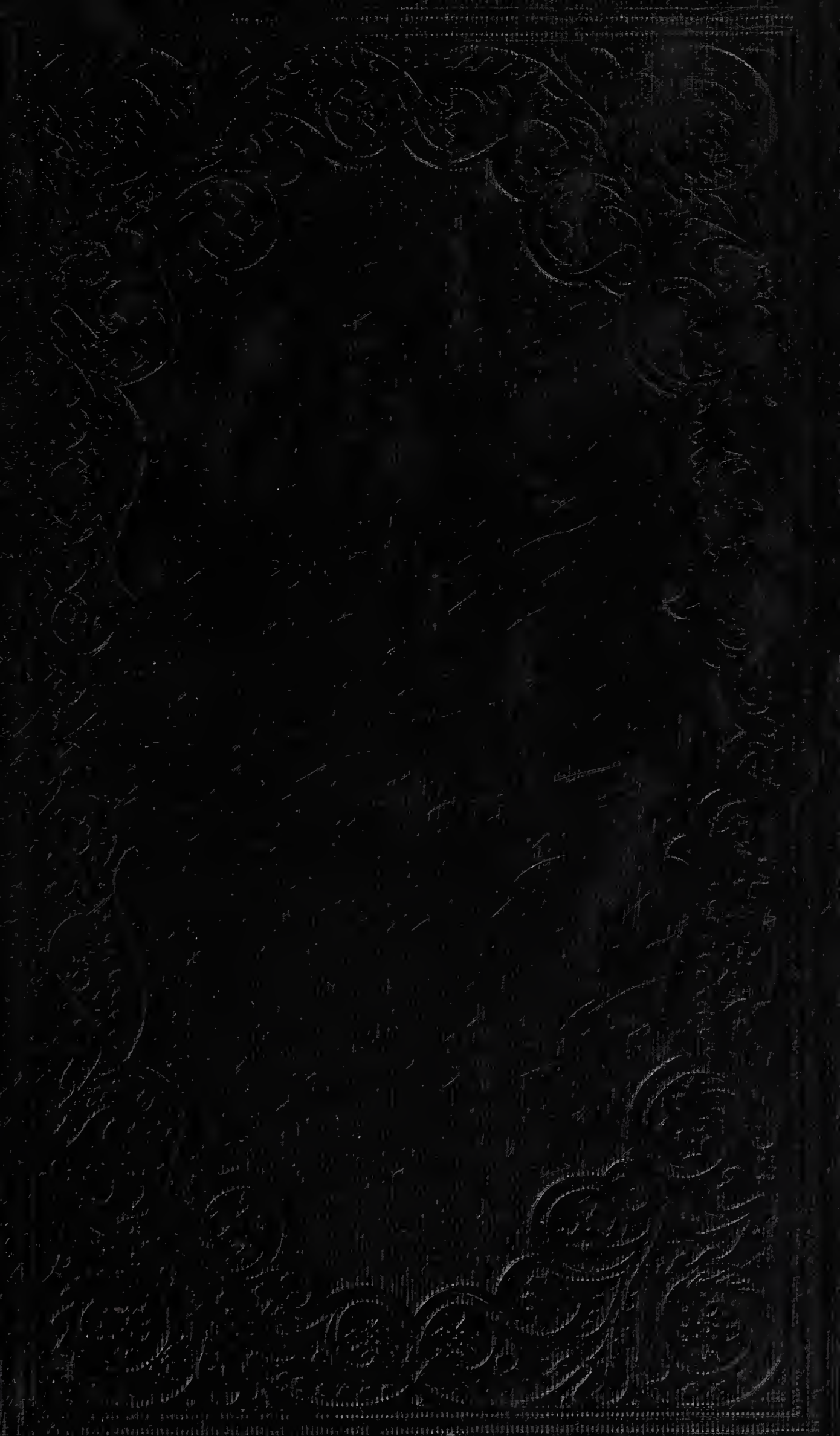

BRAITHWAITE'S RETROSPECT.

VOL. LXXXII. JULY—DECEMBER, 1880.

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QUEEN ST.
DISPENSARY

THE

RETROSPECT OF MEDICINE:

BEING

A HALF-YEARLY JOURNAL

CONTAINING A RETROSPECTIVE VIEW OF EVERY DISCOVERY AND PRACTICAL IMPROVEMENT IN THE MEDICAL SCIENCES.

EDITED BY

W. BRAITHWAITE, M.D.

LATE LECTURER ON MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN AT THE LEEDS SCHOOL OF MEDICINE, ETC.

AND

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CONTENTS OF VOL. LXXXII.

SYNOPSIS.

PRACTICAL MEDICINE.

DISEASES AFFECTING THE SYSTEM GENERALLY.

ARTICLE.		AUTHOR.	PAGE.
1	On the Antipyretic Treatment of Typhoid Fever	*Dr. William Cayley*	1
2	On the Antiseptic Treatment of Enteric Fever ...	*Dr. Rothe*	9
3	Drysdale on Pyrexin or Pyrogen as a Therapeutic Agent	*Dr. William Murrell*	10
4	Notes of a Case of Hyperpyrexia	*Dr. G. H. Philipson*	13
5	On a Case of Hyperpyrexia	*Dr. James Little*	18
6	On Micro-Organisms: their Relation to Disease ...	*Prof. Joseph Lister*	18
7	Notes on Chian Turpentine and Its Use in Cancer	*Prof. John Clay*	27
8	On Chian Turpentine in Cancer of the Breast ...	*Dr. John Gill*	34
9	On Chian Turpentine in Cancer of the Uterus ...	*Dr. J. E. Kenyon*	34
10	On Chian Turpentins in Cancer...	*Dr. Richard Drury and Dr. J. Stewart*	35
11	On Pyæmia, or Non-Specific Blood Poisoning ...	*Dr. Joseph Duggan*	36
12	On Irregular Gout, with Remarks on the Pathology of Gout	*Dr. W. R. Thomas*	41
13	On the Salicylates in Acute Rheumatism ...	*Editor of Medical Times and Gazette*	44
14	On Salicin, Salicylic Acid, and Salicylate of Soda in Rheumatic Fever	*Dr. C. Grove Young*	46
15	On Wool-Sorter's Disease	*Dr. John Henry Bell*	52

DISEASES OF THE ORGANS OF CIRCULATION.

16	On the New Cardiac Sedative—Erythrophleine ...	*Editor of Lancet*	55

DISEASES OF THE ORGANS OF RESPIRATION.

ARTICLE.		AUTHOR.	PAGE.
17	On the Inhalation of Carbolic Acid in Diseases of the Respiratory Organs	*Dr. Robert Munro*	57
18	On the Treatment of Asthma	*Dr. J. B. Berkart*	61

DISEASES OF THE ORGANS OF DIGESTION.

19	On Digestive Ferments: The Milk-Curdling Ferment—Emulsive Ferment	*Dr. William Roberts*	76
20	On the Preparation and Use of Artificially Digested (Peptonised) Food	*Dr. William Roberts*	82
21	On a Form of Dyspepsia usually Associated with an Alkaline Condition of the Urine	*Dr. C. H. Ralfe*	87
22	On the Employment of Glycerine in Flatulence, Acidity, and Pyrosis...	*Drs. Ringer and Murrell*	90
23	Case of Intestinal Obstruction Existing for Nine Months, Cured by Colo-Puncture	*Dr. John M'Gown*	92
24	On Twisting of the Intestine as a Cause of Obstruction	*Dr. Joseph Coats*	95

DISEASES OF THE URINARY ORGANS.

25	On the Treatment of Bright's Disease, and the Use of Diuretic Remedies	*Dr. W. T. Gairdner*	99
26	On the Use of Ergot in Diabetes Mellitus ...	*Dr. Joseph W. Hunt*	103

SURGERY.

FRACTURES, DISLOCATIONS, AMPUTATIONS, AND DISEASES OF THE BONES, JOINTS, ETC.

ARTICLE.		AUTHOR.	PAGE.
27	On Antiseptic Excision of the Knee-Joint (*with three woodcuts*)	*Charles Coppinger, Esq.*	107
28	On the Employment of Double Extension in Cases of Disease and Injuries of the Spine and Pelvic Joints	*Prof. John Wood*	112
29	On the Treatment of Compound Fracture with Tinct. Benzoin Co.	*Dr. Fergus M. Brown*	117
30	On the Treatment of Chronic Inflammatory Affections of the Joints in Childhood, with Especial Reference to Excision	*Howard Marsh, Esq.*	118
31	On the Aspiration of Joints	*Editor of Lancet*	121
32	On Diseases of the Wrist: with the Report of a Successful Case of Excision of that Joint in a Child Six Years Old (*with a woodcut*) ...	*John Fagan, Esq.*	122
33	On the Method of Preparing Paraffin Splints ...	*Dr. Wm. Macewen*	128
34	On Air or Water Pads for Splints	*Dr. Ed. C. Thompson*	133
35	On the Treatment of Sprains	*R. Dacre Fox, Esq.*	134
36	On Surgical Statistics—The Antiseptic Treatment	*Ed. of British Medical Journal*	137
37	Lister's Antiseptic Method of Treatment—On Carbolised Catgut Ligatures	*Dr. George Beatson*	140
38	Lister's Antiseptic Method of Treatment—On Antiseptic Sutures	*Dr. George Beatson*	151

ALIMENTARY CANAL.

39	On the Operation for the Radical Cure of Congenital Inguinal Hernia in the Child ..	*Dr. George Buchanan*	156
40	On the Treatment of Hemorrhoids by Crushing.. (*with three woodcuts*)	*George Pollock, Esq.*	160
41	On the Treatment of Hemorrhoids by Crushing	*R. F. Benham, Esq.*	166
42	On Tying Hemorrhoidal Tumours	*Dr. Bodenhamer*	167
43	On a New Instrument for the Introduction of Stitches in Operations for Cleft Palate, and other Deeply-Seated Localities (*with a woodcut*)	*Dr. Edward Woakes*	170

ORGANS OF URINE AND GENERATION.

ARTICLE.		AUTHOR.	PAGE.
44	On the Treatment of Stone in the Bladder, with Special Reference to Recent Progress	*W. F. Teevan, Esq.*	172
45	Remarks on Progress in the Treatment of Stricture of the Urethra	*Sir H. Thompson, Bart.*	180
46	On the Operations for Retention of Urine Dependent on Stricture of the Urethra ...	*John Simon, Esq.*	190
47	On the Immediate Treatment of Stricture of the Urethra (Holt's Method)	*Christopher Heath, Esq.*	197
48	On the Immediate Treatment of Stricture ...	*R. Macnamara, Esq.*	198
49	On the Immediate Treatment of Stricture ...	*James R. Lane, Esq.*	199
50	On the Treatment of Gleet and the Prevention of Stricture by Irrigation of the Urethra ...	*Reginald Harrison, Esq.*	201
51	On the Radical Cure of Varicocele by the Galvanic Ecraseur	*A. Pearce Gould, Esq.*	204

AFFECTIONS OF THE EYE AND EAR.

52	On Dr. Thomson's Ametrometer	*R. Brudenell Carter, Esq.*	208
53	On Operations for Cataract by Discission from Behind	*Prof. Wharton Jones*	209
54	On some Points in connection with the Treatment of Sympathetic Ophthalmia	*George Lawson, Esq.*	214
55	On Central Amblyopia	*Dr. George W. Berry*	218
56	On Ophthalmia Neonatorum—Purulent Conjunctivitis—Gonorrhœal Ophthalmia	*Dr. J. R. Wolfe*	225
57	On a New Treatment of Gonorrhœal Ophthalmia	*C. Bader, Esq.*	230
58	On a New Method of Treatment of Relaxation of the Membrana Tympani	*Dr. Wm. A. M'Keown*	233

DISEASES OF THE SKIN, ETC.

59	On the Treatment of Nævus by Sodium Ethylate, and the Actual Cautery	*Dr. Benjamin Walker*	239
60	On the Use of Arsenic in Skin Diseases	*Dr. Robert Farquharson*	240
61	Notes on the Treatment of Ringworm	*Dr. Wyndham Cottle*	245
62	Remarks on the Diagnosis and Treatment of Scabies	*Dr. William Sang*	249
63	On Lupus and its Treatment	*J. Hutchinson, Esq.*	253
64	On the Use of Iodide of Starch in the Treatment of Lupus Erythematodes	*Dr. McCall Anderson*	258
65	On the Treatment of Lupus by Linear Scarification	*Dr. Balmanno Squire*	260
66	On Two Cases of Lupus Treated Successfully by the External Application of Carbolic Acid...	*Dr. J. C. Hall*	262
67	On the Etiology of True Leprosy	*J. Hutchinson, Esq*	263

MIDWIFERY, AND THE DISEASES OF WOMEN AND CHILDREN.

ARTICLE.		AUTHOR.	PAGE.
68	A Note on the Treatment of Sub-Involution of the Uterus	*Dr. J. Braithwaite*	270
69	On Intra-Uterine Puerperal Coagula	*Dr. Matthews Duncan*	272
70	On the Treatment of Puerperal Fever	*Dr. Matthews Duncan*	277
71	On the Use of the Forceps	*Dr. G. Hamilton*	285
72	On a Case of Spontaneous Expulsion of Large Uterine Fibroids	*H. W. Jackson, Esq.*	287
73	Case of Rupture of Uterus—Probably in attempts to remove an Adherent Placenta	*J. Bain Sincock, Esq.*	290
74	On the Treatment of Menorrhagia	*Dr. Matthews Duncan*	292
75	On the Various Methods of Dealing with the Pedicle in Ovariotomy	*Dr. J. Knowsley Thornton*	293
76	On the Diagnosis of Tumors of the Mammary Glands	*Dr. Samuel W. Gross*	301
77	On a Modification of Sampson's Forceps (*with a woodcut*)	*Prof. A. R. Simpson*	308
78	On a New Cervical Curette (*with a woodcut*) ...	*Dr. Alexander Duke*	308
79	On the Treatment of Convulsions in Children ...	*Dr. A. A. Smith*	309

ADDENDA.

80	Annotations on Anæsthetics	*Samuel Osborn, Esq.*	314
81	On Ethidene-Dichloride	*J. T. Clover, Esq.*	319
82	On Bromide of Ethyl, or Hydrobromic Ether ...	*Dr. Marion Sims*	324
83	Description of an India-Rubber Inhaler for Ether Anæsthesia (*with two woodcuts*)	*B. Wills Richardson, Esq.*	327
84	On Acetate of Alumina as an Antiseptic ...	*Ed. of Medical Times and Gazette*	329
85	On a New Antiseptic and Anti-Neuralgic Remedy	*Dr. A. D. Macdonald*	331
86	On the Physiological and Therapeutic Aspects of Opium	*M. Pecholier*	336
87	Some Clinical Observations on Two Cases of Hemophilia	*Dr. W. H. T. Winter*	338
88	On the Use of Nitro-Glycerine in Migraine, Asthma, and Angina Pectoris...	*A. W. Mayo Robson, Esq.*	344
89	On Citrate of Caffein as a Diuretic	*Dr. D. J. Leech*	345
90	New Porte-Vaccine Case (*with a woodcut*) ...	... ...	349
91	Salt & Son's New Urinary Test Case (*with a woodcut*)	... ...	350
92	Dr. Dudgeon's Pocket Sphygmograph (*with a woodcut*)	... ...	351
93	"Registered" Urinary Microscope (*with a woodcut*)	... ...	352

SHORT ARTICLES IN SYNOPSIS,

NOT INCLUDED IN THE FOREGOING LISTS.

ARTICLE.	AUTHOR.	PAGE.
Benzoic Acid in Acute Rheumatism	*Dr. H. Senator*	xii
Antipyretic Treatment in Typhoid Fever	*Dr. William Cayley*	xvi
A Constant Bath Treatment of Fever	*Dr. Reiss*	xvii
Aconite in the Treatment of Enteric Fever	*Dr. R. H. Blackwell*	xviii
Nitrite of Amyl in Neuralgic Headache	*Dr. James More*	xix
Salicylic Acid and Salicylate of Soda in Sciatica and Neuralgia	*Dr. Abbot*	xix
Oxalate of Cerium in Cough	*Dr. Cheesman*	xxii
Cotton Wool as a Vehicle for the Medication of Nasal and other Regions	*Dr. E. Woakes*	xxiii
On the Treatment of Ozæna	*Mr. Lennox Browne*	xxv
Chloride of Calcium in the Treatment of Phthisis ...	*Dr. R. Neale*	xxvi
New Method of Plugging the Posterior Nares ...	*Dr. J. M. Spear*	xxvii
Subcutaneous Injection of Ergotine in Prolapse of the Rectum	*M. Emile Vidal*	xxxii
Cus as a Tænicide in Tapeworm	*Dublin Med. Journal*	xxxiii
Lactic Acid in Catarrh of the Bladder and Some Forms of Acute Cystitis	*Th. Deecke*	xxxiv
Antiseptic Injections in Chronic Cystitis	*C. H. Ralfe, Esq.*	xxxv
Absorbent Cotton-Wool and Gauze Antiseptic Dressings	*Lawson Tait, Esq.*	xliii
Catgut for Ligation of Arteries in their Continuity ...	*Dr. E. Bœchel*	xlviii
Short Directions for Lister's Antiseptic Dressings ...	*Practitioner*	lii
Remedy for Corns	*Mr. Gezow*	lvii
Removal of Encysted Tumours in Conspicuous Positions without leaving any Mark	*Dr. Philip Foster*	lvii
Local Treatment of Erysipelas	*P. J. Leniham, Esq.*	lvii
"Startin's Mixture" in Erythema Multiforme, Erythematous Eczema, and Urticaria	*Dr. Bulkeley*	lvii
Prevention of Pitting in Small-Pox	*Dr. Schwimmer*	lxiii
Prevention of Pitting in Small-Pox	*Dr. A. Clark*	lxiii
Sweating of the Feet—Boracic Acid Solution ...	*Dr. George Thin*	lxiii
Hydrate of Chloral Injections in Gonorrhœa ...	*Dr. Pasqua*	lxiv
On the Treatment of Gonorrhœal Ophthalmia ...	*Dr. Marcus Gunn*	lxv
Methods adopted in a Series of Cataract Operations...	*Dr. John B Story*	lxvii
On the Treatment of Corneal Ulcers	*Dr. Marcus Gunn*	lxviii
On the Use of Boracic Acid in Eye Diseases ...	*Dr. Theobald*	lxviii
Mydriatic Properties of Homatropia or Oxytoluyl-thropein	*John Tweedy, Esq.*	lxix
On the Use of Belladonna in Nictitation	*Dr. T. F. Pearse*	lxix
On Displacement and Descent of the Uterus ...	*Dr. Matthews Duncan*	lxxi
On Displacement and Descent of the Uterus ...	*Dr. Knowsley Thornton*	lxxi
On Hydrobromic Ether as an Anæsthetic in Labour .	*Dr. Turnbull*	lxxi
Treatment of Sore Nipples...	... ...	lxxv
New Combination Anæsthetic—Ethylen Dichloride with Nitrous Oxide Gas	*W. B. Macleve, Esq.*	lxxvii
How to get Leeches to Bite...	... ...	lxxviii
Tonic Glycerine	*Dr. Larmande*	lxxix
On the Official Introduction of Vaccination with Calf-Lymph	*Ed. Brit. Med. Jour.*	lxxix
Vesicant Collodion	*Dr. Hisch*	lxxx
Waterproof Paper—A Substitute for Oil Silk ...	*Dr. Keen*	lxxx

SYNOPSIS.

AN ABSTRACT OF THE MOST PRACTICAL ARTICLES IN THIS VOLUME, WITH OTHER SHORT ARTICLES FROM THE MEDICAL JOURNALS, SHOWING THE MOST IMPORTANT INDICATIONS OF TREATMENT PUBLISHED BY DIFFERENT WRITERS DURING THE HALF-YEAR. ARRANGED ALPHABETICALLY.

AFFECTIONS OF THE SYSTEM GENERALLY.

ACUTE RHEUMATISM.—*Salicin, Salicylic Acid, and Salicylate of Soda.*—Salicin, salicylic acid, and salicylate of soda are useful preparations in some cases of rheumatic fever. Cases in which they appear to do most general good are those that have no tendency to heart complications, the temperature not being high, and the patient being in his first attack. Such patients are relieved of the pain and swelling in from thirty-six hours to six days, and convalescence is completed in from ten to twenty-five days; and the length of time ill prior to treatment does not influence the treatment. Patients that have suffered from previous attacks, when murmurs in the region of the heart are left, are benefited by these preparations, as far as their recent symptoms are concerned, and in as short a time as those in their first attack, but their convalescence is more tedious. These preparations are useless, either as relievers of pain, or as reducers of temperature, in cases which are complicated with pericarditis, even when the temperature is not high; nor does their early administration, and in large doses, keep off this complication. They also appear to be of no use in cases that have a temperature higher than 104·5°. (Dr. C. Grove Young, p. 46.)

Salicylate properly handled is a remedy of very great value in the treatment of acute rheumatism, and Dr. Greenhow "fully admits the great immediate relief which appears to follow the use of these agents in the treatment of rheumatic fever." But he questions, whether, on the whole, the salicylate treatment is successful. That, he says, must be tested by three considerations: the risk of complication, the condition of the patient on recovery, and the length of time the patient is disabled. In every one of these particulars, especially with regard to relapse, Dr. Greenhow's experience leads him, he

says, to go against the use of the salicylate. It does not even prevent hyperpyrexia, though a most powerful antipyretic. It tends, says the author, to produce anæmia, and the patients treated by it are slow to regain health and strength. Finally, he observes, "With regard, therefore, to the treatment of rheumatic fever with salicin and salicylate of soda, we must, I think, come to the conclusion that most physicians did with regard to the treatment with blisters, viz., that the pain and distress of the patients are undoubtedly for a time greatly assuaged, but that the duration of the illness is not shortened." Our impression is that with salicylate, as with many other things, men have rushed to extremes. They have overlooked the true use and value of the drug, which is evidently to lessen fever and diminish pain; but that being done, its work is accomplished, and something else should take its place. (Editor of Medical Times and Gazette, p. 44.)

Benzoic Acid.—Dr. Senator reports very favourably of benzoic acid and the benzoates in the treatment of acute rheumatic polyarthritis. Since the beginning of 1877 he has had under his care 46 cases treated by these remedies. The first group of cases, 22 in number, had benzoic acid or the benzoate of soda (in doses amounting ultimately to about 230 grains per day) and no other medicine; in one of these cases, which was treated with small doses at first, the violence of the disease did not subside till the eleventh day; in 20 cases the pain and fever disappeared in 3-7 days, and in another case in 2 days. There were no relapses, and no cardiac or other complications were observed. That these good results were really due to the benzoic acid is shown by the fact, that, in a second group of cases (4) the disease yielded promptly to that remedy, though it had previously resisted treatment by salicylic acid. In a third series of cases (6) benzoic acid failed, but salicylic acid gave immediate relief. From these cases and 14 others, in which salicylic and benzoic acids were used alternately, the author concludes that in benzoic acid we have an agent which exercises a very powerful influence on acute rheumatism, inferior in virtue only to salicylic acid. Its great advantage is, that even in large doses it is well borne by the patient. It and its salts are, therefore, recommended for trial in those cases of polyarthritis in which salicylic acid or its compounds cannot be used, or have been tried and found ineffectual; it may be given in the same doses, or even in larger doses, than the latter remedy. (Dr. H. Senator, Glasgow Medical Journal, June, p. 499.)

Blood Poisoning.—Blood poisoning may be divided into specific, such as small-pox; and non-specific, such as septicæ-

mia. In pyæmia or septicæmia few remedial agents are of much benefit. The hyposulphides, indeed are rational remedies; they were found most successful in the practice of Prof. Polli, of Milan, who first made known their efficacy, and in every case I think their use would be beneficial In the treatment of specific blood-poisoning, such as small-pox, I used solutions of sulphurous acid in mixture with marked benefit; also permanganate of potash, chlorate of potash in bark, with like results; but none of those remedies succeeded so well in my hands as moderate doses of spirits of turpentine and liq. ferri perchlorid. If those remedies are found useful in specific, they ought also to be of service in this affection, and I daresay the benzoate of soda would act beneficially, as I have used it in half-drachm doses very successfully in checking strumous purulent formations. The new remedy, calc. sulph., I have had no experience of, but I am strongly of opinion that it ought to be useful in pyæmic cases. (Dr. Joseph Duggan, p. 36.)

Cancer.—*Chian Turpentine.*—The statements made in my original paper as to the efficacy of Chian turpentine in cancer appear to me to be fully confirmed by the additional experience gained in the use of the remedy. In the cases previously reported the cancer has disappeared, and there are no signs of its return. In my original experiments the turpentine alone was used in order to thoroughly test its efficacy, but it now appears that the use of certain local and general measures undoubtedly promotes the convalescence of the patient. It is possible, therefore, to formulate a line of treatment which shall be successful in cancers of the uterus. Henee, given a case of cancer limited to that organ, and a steady use of the remedy for six or eight months, continued with certain general and local remedies if necessary, and a disappearance of the cancer may be reasonably expected. Eleven cases of uterine cancer under this treatment at the Queen's Hospital, besides a number of others in private practice, so far justify the preceding statements. (Prof. John Clay, p. 27.)

Gout.—Gout when not hereditary is a disease invariably produced by excessive indulgence in food or drink, oftentimes accompanied by want of exercise. Excess of food by supplying excess of nitrogenous materials for the blood tends ultimately to produce excess of urea and uric acid, which have to be expelled by the kidneys. These organs perform their functions properly for a while, but the excessive work thrown upon them for a considerable time ultimately tends, as in chronic alcoholism and disease which interfere with the action of the skin, to produce disease and consequent ineffi-

cient action of the kidneys. Distilled spirits do not seem to produce gout to the same extent as wine, porter, and ale. Although there is a great hereditary tendency in gout, still generations do escape because the children, having seen the sufferings of their parents, sometimes have the good sense to avoid the exciting causes, and thus escape. We know that in gout we find an excessive quantity of uric acid in the blood, and that the quantity daily excreted by the kidneys is diminished, and as we frequently find that in other diseases accompanied by excessive formation of urea and uric acid the kidneys are quite able to excrete as much as is required of them, we may safely come to the conclusion that from some cause there is deficient action of these organs, and consequent retention of materials which ought to have been excreted; for the urates, cartilage cells, fibrous tissue, and epithelial cells seem to have an affinity, and deposit in and around them takes place, producing diseases of joints, eruptions of skin, and inflammations of mucous membranes. New deposit may take place in the kidneys, interfering still more with the functions of those organs to such an extent that it is not satisfied now with small joints at a distance from the heart, but attacks the larger joints. (Dr. W. R. Thomas, p. 41.)

Typhoid Fever.—*Cold Baths.*—The factor in typhoid fever which is most under our control is the febrile heat: it lies in our power to prevent the temperature throughout the whole course of the disease from rising above a very moderate height; and hence we may obviate those injurious effects which are directly or indirectly caused by the febrile state as such. The great acceleration of the pulse and breathing, the febrile oppression and malaise, the dry brown tongue, the thirst, the headache, the delirium, the stupor—may all be controlled. Nay, not only can we prevent the accession of these symptoms, but sometimes we can remove them after they have supervened. And, as a result, the granular degeneration and softening of the various organs and tissues, and the febrile consumption itself, may be in part checked. Therefore, from Hippocrates downwards, to reduce the temperature has at all times been regarded as one of the most important indications of the treatment of fever. It would seem, then, that all we have to consider is how far we are able to effect this, and whether the means which we employ are in themselves devoid of danger. With regard to the first, it can be experimentally shown that by the repeated application of cold to the surface of the body—chiefly by means of cold water on the one hand, and on the other by the administration of certain drugs which have the property

of reducing temperature, the most important being quinine, salicylate of soda, and digitalis—the febrile heat can almost always be controlled. Most practitioners would be horrified at the idea of exposing a patient, prostrate and delirious from typhus, to a cold draught from an open window, in a state of nudity; and yet by this means Dr. Currie at once relieved the threatening symptoms, and the patient made a good recovery. Usually when we are called to a case of fever we find the patient warm in bed, covered by several blankets, a good fire in the room, all draughts carefully excluded, and everybody anxious lest he should catch cold. I have seen a case of typhoid where the temperature was 105°, and there were five blankets on the bed. Now, in health it makes little or no difference to the internal temperature of the body whether there are five blankets or none, but in the labile temperature of typhoid fever it not unfrequently means a difference of 2°. The modes of applying cold water are the cold bath, cold affusion, cold packing, cold compresses, and the graduated bath, which consists in placing the patient in a warm bath and gradually cooling it down. Each of these methods is adapted to special cases, but for general use the cold bath is by far the best and the least troublesome to apply, and the rule for its use is this: whenever the patient's temperature exceeds 102·2° he should be put into a bath. It must be remembered that Dr. Brand always takes the temperature in the rectum. If we measure in the axilla, a somewhat lower height must be taken. He insists very strongly on the great advantages of rectum over axillary measurements, and there can be no doubt but that he is right; but I am so convinced of the impossibility of taking rectum temperatures six or eight times a day in this country, even in hospital practice, that, except under special circumstances, I never attempt to do so. Next with regard to the temperature of the bath. This must be regulated according to the patient's condition and the effect we wish to produce. As a rule it should not exceed 70° Fahr., and may often be advantageously much lower; 65° to 70° may be taken as the average limits. The duration of the bath must also be regulated by the patient's condition and the effect it produces. We ought to cause a reduction of at least two or three degrees, and if this is not obtained the next bath must be colder or longer. It must be remembered that the temperature usually continues to fall for some time after removal from the bath; it is therefore not necessary to take the temperature in the bath itself, but it should be done about half an hour after. The bath should be prolonged for some little time after distinct shivering has begun, watching, of

course, the effect on the circulation. Usually the bath will be well borne for from ten to twenty minutes. The patient should then be put to bed, wiped dry, and covered with a blanket. In many cases it is advisable to give some brandy or other stimulant before or during the bath. In severe cases the cooling effect of the bath often only lasts about three hours; therefore the temperature should be taken every three hours by day and night, and whenever the temperature rises to 102° the bath should be repeated. (Dr. W. Cayley, p. 1.)

Granting the general efficacy of the antipyretic treatment, we have next to consider whether it be adapted to all cases, and ought to be indiscriminately applied. To this, I think, we must answer that under no circumstances ought we to allow the temperature to maintain itself continuously above 102°. But the means employed to reduce it must vary with the condition of each case. The most efficacious and most generally applicable of these methods—the cold baths—may be inadmissible. Sometimes the patient cannot bear them; they may cause a dangerous depression, or even syncope. As a rule, persons advanced in life and of impaired constitution are less able to support the baths; but these are the cases in which it is especially important to prevent the injurious effects of the temperature. If necessary, then, we must have recourse to the graduated bath, to cold packing, cold sponging, cold compresses, together with quinine and digitalis. The cold bath may likewise cause other unpleasant symptoms, as cramps and neuralgic pains. I have recently had under my care, in the Middlesex Hospital, one of the nurses, in whom the early symptoms were extremely severe. The temperature on the third day exceeded 105° in the axilla, and it was with great difficulty controlled. She had twelve cold baths; but the last two caused very severe neuralgic pains, principally in the sciatic nerves; so that they had to be discontinued, and we were compelled to resort to the graduated bath, sponging, packing, and quinine in thirty-grain doses; and by these means, after the obstinacy of the temperature had been broken, as it were, by the repeated cold baths, we succeded in keeping it under. Another question of great importance is whether pneumonia, bronchitis, and congestion of the lungs are induced or rendered more severe by bathing. I think that to this question we may give a negative answer. In typhoid fever, the former are probably due to the action of the poison, and the hypostatic congestion to the failure of the heart; and they are usually manifestly benefited by reducing the temperature. With regard to pneumonia it is now the common practice in Germany to treat the idiopathic form of the disease in the same manner,

and with excellent results. (Dr. W. Caley, British Medical Journal, May 8, p. 686.)

A Constant Bath Treatment of Fever.—Dr. Reiss, of Berlin, has proposed the employment of the bath in the treatment of typhoid and other febrile diseases, in a somewhat novel form. The antipyretic effect of brief and powerful refrigeration is often transient, and at the height of the disease hourly or half-hourly baths have to be employed. It is proposed, therefore, to employ a continuous but slighter refrigerating agent—namely, to keep the patient constantly in a bath of lukewarm water. A temperature of 88° has been found the most convenient. The use of such baths obviously prevents considerable practical difficulties, which are, however, not insurmountable. The patient should lie in a sheet suspended, hammock-like, within the bath, and when the first inconveniences are over the patients enjoy it, and can be kept in it for a whole day or several days. Dr. Reiss has tried the method in forty-eight cases of typhoid (besides one incompletely treated case). It was used only in pronounced cases, for the most part in the early stage, the bath being commenced at from the third to the twelfth day. The temperature was taken every one or two hours, in either the rectum or axilla. As a rule the bath was continued without intermission for the first twenty-four hours, unless the fall of temperature was too great. After the second day the rule was followed to take the patient from the bath whenever the rectal temperature was below 99·2°, and to reimmerse whenever the temperature rose above 101·5° F. The results are said to be strikingly good. With the exception of some very obstinate cases, the temperature fell quickly in the bath so as to reach the normal in from twelve to twenty-four hours. On removal, the temperature rose rapidly in the earlier stages of the disease, more slowly in the later periods, so that the intervals between successive baths were at first short and afterwards gradually lengthened. In obstinate cases, in which the bath at 88° F. did not reduce the temperature below 102°, transient cooler baths were employed to keep the temperature down. (Dr. Reiss, Lancet, Sept. 4, p. 389.)

Iodine and Carbolic Acid.—Dr. Rothe ascribes an intense "antipyretic" action to the combination of iodine and carbolic acid. A comparison of nineteen cases of enteric fever treated by this combination shows that in all alike first the pulse, and then the temperature sank, within from two to seven days—the pulse frequently below the normal, without ever rising to its former height except when the medicine was discontinued, or given less frequently by way of experiment. Oil of pepper-

mint completely disguises the disagreeable smell; and gastric or sensorial disturbances, which sometimes attend the use of the above-mentioned remedies, were never observed. The medicine has also the recommendation of cheapness—a very important circumstance in view of the present high price of quinine. It seems important that the remedy should be given in sufficient quantities (1 to 2 of carbolic acid, and 1 of tincture of iodine, in 120 of water), a tablespoonful being given hourly, until a decided effect on the pulse and temperature is produced, and then every two hours, until apyrexia follows; and it should be continued for three or four weeks. (Dr. Rothe, p. 9.)

Aconite.—As regards treatment, the unmistakable action of aconite in lessening the frequency of the pulse and lowering temperature in the early stages of the fever is evident. For the last twenty-five years I have been in the habit of giving aconite in the form of Fleming's tincture, three to five minims, every four hours, with this object, and have rarely seen it fail to do good, not only in enteric fever, but in all febrile diseases or acute inflammations. The wet pack is also a most powerful agent, and affords immense relief. I use it with the view of assisting the elimination of the poison by the skin, on the ground that the poison, by producing the rose-spots, shows a tendency to eliminate itself in that way, and if we can encourage this tendency we shall lessen the danger of internal lesions. (Dr. R. H. Bakewell, Lancet, April 10.)

AFFECTIONS OF THE NERVOUS SYSTEM.

Migraine, Asthma, Angina Pectoris, &c.—*Nitro-Glycerine.*—In *migraine* one or two drops of a one-per-cent. solution of nitro-glycerine produces, within a few minutes, a diminution of tension in the previously corded temporal artery and relief of the pain, which in some cases does not return, but in others recurs when the physiological effects of the drug have passed off. As individuals are affected differently by nitro-glycerine, I always begin with one minim of the one-per-cent. solution, but sometimes find it necessary to increase the dose to three or four minims, to produce the desired effect. In several cases of *asthma*, it has relieved the breathing in a most remarkable manner: the cases in which it answers are such as would be relieved by amyl-nitrite, but its effects are more marked and the relief is more durable. One case of severe asthma, occurring in a patient suffering from chronic renal mischief and mitral deficiency, is worth specially mentioning. I prescribed the one-per-cent. solution in the form of a minim to a drachm of

water, and ordered two drachms to be taken every quarter of an hour till relief was obtained. My patient, however, had two large tablespoonfuls of the medicine given, instead of two teaspoonfuls. He said that the effect was wonderful; he thought his head was going to burst, but his breathing was effectually and permanently relieved, and that instantly. In this case, amyl-nitrite, although inhaled in large doses on previous occasions, had given very little relief. Since that time, several months ago, he has been threatened over and over again with his old attacks, but a dose of the medicine always staves it off. In *angina pectoris*, the relief given by nitro-glycerine is most complete; but, as several cases have been reported in the journals, I need only mention it. The relief in these cases is not simply temporary ease from pain, but, if the remedy be given thrice daily in gradually increasing doses, beginning with one minim of the one-per-cent. solution and steadily advancing to eight minims, the attacks lessen both in frequency and intensity. One of my patients, who has suffered severely from angina, always carries a bottle of the medicine in his pocket, and he tells me that, by taking a dose of five drops, when he is threatened with an attack, it is always prevented. (Mr. A. W. Mayo Robson, p. 344.)

Neuralgic Headache.—*Nitrite of Amyl.*—Nitrite of amyl is a good type of a remedy which acts decidedly and quickly as a dilator of the peripheral arterioles. This pronounced action is taken advantage of by the practitioner in all those ailments which seem to depend on an increased arterial tension, the result of arteriole spasm—as in angina pectoris and some forms of hemicrania. I shall not soon forget its effect on the first case of the kind in which I tried it. A woman came into my surgery perfectly blind from the effects of neuralgic headache—a true example of Du Bois Reymond's "hemicrania sympatico tonica." Three drops of the nitrite of amyl inhaled from the palm of her hand flushed the capillaries of her face in two or three seconds, and she walked out of the surgery perfectly recovered. (Dr. James More, Practitioner, Nov., p. 356.)

Sciatica and Neuralgia.—*Salicylic Acid and Salicylate of Soda.*—Dr. Abbot in the Boston Medical and Surgical Journal gives an account of three cases of sciatica, and three of acute facial neuralgia, in which these drugs were employed with success. He says:—"These cases seem to show that we have, in salicylic acid and its compounds, as reliable a remedy in acute neuralgia as in acute rheumatism. Perhaps they indicate a closer affinity between the diseases than has been generally suspected. Two of the cases had bad attacks of

rheumatism. The cases, with the exception of the third case of sciatica, were all severe, and nothing could be more satisfactory than the very prompt and efficient relief which followed the exhibition of the remedy." He thinks that cases of a more chronic character will not be so amenable to this treatment. (Dr. Abbot, Glasgow Medical Journal, June, p. 509.)

AFFECTIONS OF THE RESPIRATORY SYSTEM.

ASTHMA.—*Pilocarpin.*— Unfortunately, the most reliable remedies in use are of so slow operation as to be practically useless during the paroxysm, because the patient cannot or will not submit to measures which do not afford immediate benefit. Only one remedy—jaborandi and its alkaloid pilocarpin—approaches more nearly than any other the above requirement. The powerful revolution which pilocarpin produces in the distribution of the blood must necessarily have a very beneficent influence in some forms of asthma; for by attracting a large volume of blood to the skin and to the salivary glands, and by diminishing its volume through the copious perspiration and salivation the congested internal organs are relieved in a corresponding degree. An adequate conception of the pathological changes in the lung, indicating the use of pilocarpin, may be formed by observing an analogous process in the lower extremities. In connection with varicosities, the leg at one time increases in circumference, the pale and dry tissues presenting a peculiar inelastic and spongy feel; at another the enlarged leg has a dark brown colour, and its tissues are apparently indurated; at another, in these circumstances, an ulcer developes itself. *Mutatis mutandis*, the same takes place in the lungs; only the interstitial changes in the lungs—in origin, in nature, and in progress precisely similar to those observed in the legs—are not amenable to diagnosis, unless they perceptibly diminish the volume of air, or interfere with its entrance or exit to and from the lungs by implicating the bronchi. Here, then, pilocarpin has the same effect as the bandages in varicosities of the extremities. Within a few minutes, the application of the drug is followed not merely by amelioration of the subjective symptoms, but by a corresponding improvement of the physical signs. Of course, a remedy that so powerfully exalts one function necessarily depresses another, and therefore its use requires some caution. But with a little attention the remedy can be safely and successfully managed. I have found the alkaloid preferable to the plant, because, 1, it acts more rapidly; 2, it does not produce stranguary; and 3, the dose can be more accurately

determined. Those whose cardiac muscles are from whatever causes in a state of fatty degeneration, may, under the influence of pilocarpin, present the most alarming symptoms. However, the cause for alarm soon spontaneously subsides, the heart regaining its previous force; but if it lingered to do so, a subcutaneous injection of 1-120th or 1-60th grain of atropine immediately restores the balance. Pilocarpin is more suitable in the treatment of the younger asthmatics, but is by no means contraindicated in patients of more advanced age. The dose should not exceed one-third of a grain. I have never used more than ten drops of a two-per-cent. solution. During the action of the drug, the patient should preserve the recumbent posture—which the almost immediate relief obtained will enable him to do—and he should be carefully watched until the effect has passed off. It is desirable to have a solution of atropine always at hand in case of need. It is well, also, not to use pilocarpin soon after the patient's meals; if the dyspnœal seizure occur under these circumstances, there are, it is needless to say, other remedies more suitable. In one case related, ten drops of a two-per-cent. solution of pilocarpin were injected into the left forearm. The patient passed a very good night; he awoke only once, at about 2 a.m, with slight cough. For the first time for many years, he had been able to lie down. Breathing was easy, and air freely entered and passed out of the chest. In several cases the asthmatic paroxysms were speedily—within a few minutes—relieved by pilocarpin; and that relief was due, not merely to the suppression of the painful perception of the dyspnœa, but to the removal, as far as practicable, of its immediate and remote causes. Moreover, the improvement lasted long after the effects of the drug had passed off, and in several instances it was almost complete. Considering the decrepitude of those patients, the unfortunate circumstances of their surroundings, and their inability of following the reparative process thus initiated, the success was all that could be expected. The place of pilocarpin in therapeutics is determined by its physiological action. In all cases of chronic pneumonia, in which the nutritive disturbance proceeds from the surface of the bronchi and gradually spreads to the stroma of the lungs, or in which it commences in the interstitial tissue and implicates the mucous membrane of the air-tubes—whether the process terminates in atrophy or in sclerosis—there pilocarpin, provided the state of the heart offers no contraindication, will prove beneficial. More speedily and more safely than any other remedy. it relieves the congestion of the bronchial mucous membrane, favours the expulsion of the obstructing plug of the air-

passages, prevents the formation of viscid mucus, diminishes the swelling of enlarged bronchial glands, and initiates a reparative process, if such be yet possible, in the infiltrated connective tissue of the lungs. Although in its effect it somewhat resembles that of a warm, or rather of a Turkish bath, it is for many reasons preferable to the latter, even in the intervals between the asthmatic seizures, when alone there can be a question of substitution. To obtain, however, the full benefit it is capable of producing, pilocarpin should be used systematically. It should be injected at intervals, commensurate to the forces and to other circumstances of the patient, until the pathological changes in the lungs are perceptibly improved. (Dr. J. B. Berkart, p. 61.)

Pulmonary Asthma.—Foremost amongst the forms of asthma which are distinguished by the frequency of their occurrence and by the severity of the symptoms, is œdema of the lungs, as it occurs in the obese and the cachectic, and in those suffering from valvular lesions of the heart, from gout, and from renal disease (uræmic asthma). It is invariably the result of a temporary failure of the left ventricle, while the right is still able to act; and developes itself, either in the midst of apparently perfect health with the suddenness of a fainting fit, or as a rapid exacerbation of an existing cardiac derangement. The subcutaneous injection of one-sixth of a grain of morphia acts, indeed, like a charm. As soon as the morphia is absorbed, which requires a longer time than in health, the painful oppression of the chest and the hacking cough disappear; the noisy and frequent respiration becomes quiet and slower; the cyanosis of the face and lips gives way to a flush; the cold and clammy skin becomes warm and moist; the contracted artery widens and fills; the heart regains its previous force and rhythm, and with them return its impulse, its sounds, and its murmurs, while the consequence of its temporary failure as regards the lungs subside more or less completely. There is, subsequently, neither languor nor drowsiness, even in those who at other times are very susceptible to the influence of narcotics. Morphia merely counteracts the effect of the abnormal quantity of carbonic acid in the blood, and, with the attainment of that object, its influence is exhausted. (Dr. J. B. Berkart, p. 71.)

Cough.—*Oxalate of Cerium.*—Dr. Cheesman, in the New York Medical Record, reports favourably of the trials he has made of oxalate of cerium in St. Luke's Hospital, New York, between July and November 1879. During the early part of August, owing to the marked success of the oxalate, opiates

and other medicines were abandoned, the oxalate being, with rare exceptions, solely used until November, among a daily average of twenty-five patients representing all the stages of phthisis. It was best given by placing it as a dry powder on the tongue, on an empty stomach. It was usually given in a five-grain dose at bedtime, or on waking in the morning, or both; the dose being increased, unless relief was obtained, to ten grains or more three times a day. Sometimes the cough, after being relieved by small doses, returned, and was relieved by increasing the dose; and occasionally large doses succeeded at once when small ones had failed. The effects of the drug were prolonged by reducing or stopping the doses as soon as relief came, and increasing or resuming them on return of the cough. In several cases, after one or more failures, a subsequent trial with the same patient was successful. The wards were evidently quieter while the oxalate was in use. The best effects were noticed in the early stages of phthisis, or in chronic bronchitis; but a hoarse, harassing cough, with profuse expectoration, in the third stage, was in several cases relieved, the cavities being then emptied without violent coughing or great effort. Nausea and vomiting were rare among the phthisis patients while the oxalate was in use; it never disturbed digestion, the appetite and digestion being often speedily improved. In dyspnœa with an asthmatic element it affords more or less relief. Sleep was frequently restored. No dangerous symptoms appeared. The largest dose was twenty grains, and this was not repeated the same day, although given in a few instances to patients taking ten grains twice at other periods of the day. The majority of the sixty-nine trials made were on males. Of the sixty-nine trials, thirty-nine were markedly successful, nineteen more or less so, and eleven were failures. (Dr. Cheesman, Medical Times and Gazette, July 3, p. 27.)

Medication of Nasal and other Regions.—*Cotton Wool as a Vehicle for.*—In view of the want of a satisfactory means of applying medicaments to the post-nasal region, Dr. Woakes suggests medicated wool, for the use of which he gives the following directions:—The quantity of wool determined upon, usually from two to three grains by weight, is twisted spindle-shape, but loosely, upon a piece of thread or silk; the thin ends are brought together or tied with a knot; thus the spindle-shaped pledget of wool is doubled upon itself and secured firmly to the thread, having now a pear-shape, the stalk being represented by the thread. A blunt probe is engaged in the wool and made to conduct it along the floor of the nose to the spot where it is to be retained. The process is then repeated on the other side, the threads

from each pledget hanging out from either nostril. These are now tied together below the septum, by which means the patient will be assured the wool will not be swallowed. In the morning, supposing the application to be made overnight, they can be withdrawn by pulling on the threads. In this way any drug that may be selected can be introduced with ease, and with a little skill in the manipulation, the vault of the pharynx, Rosenmüller's fossa, or the neighbourhood of the Eustachian tubes, may be topically medicated. If it is desired, several such pledgets may be introduced in succession, until a sufficient quantity has been placed *in situ;* the threads belonging to all can then be tied together and secured. The following formulæ are given for the preparation of medicated cotton-wools :—ASTRINGENTS.—*Perchloride of Iron Wool:* cotton-wool, one drachm; glycerine, ten minims; tr. fer. perchlor., one ounce. *Tannin Wool:* cotton-wool, one drachm; glycerine, ten minims; tannin, one drachm; rectified spirit, six drachms. *Alum Wool:* cotton-wool, one drachm; glycerine, ten minims; alum, half a drachm; water, one ounce. *Rhatany-Kino-Catechu Wool:* cotton-wool, one drachm; glycerine, ten minims; tr. catechu vel rhatany, one ounce. *Hamamelis Wool:* cotton-wool, one drachm; glycerine, ten minims; tr. hamamelis, half-an-ounce. ANTI-CATARRHAL.—*Cubebs Wool:* cotton-wool, one drachm; glycerine, ten minims; tr. cubebæ, one ounce. ANTISEPTIC, DISINFECTANT, AND STIMULANT.—*Camphor Wool:* cotton-wool, one drachm; glycerine, ten minims; æth. rect., one ounce. *Boric, or Boracic Wool:* cotton-wool, one drachm; glycerine, ten minims; boric acid, one drachm; sp. vin. rect., six drachms. *Iodine Wool:* cotton-wool, one drachm; glycerine, ten minims; tr. iod., half-an-ounce. SEDATIVE.—*Opium Wool:* cotton-wool, one drachm; glycerine, ten minims; tr. opii, half-an-ounce. *General Directions:* Mix the glycerine with the tincture, or other solvent; saturate the wool with the liquid, and dry. (Dr. E. Woakes, Lancet, June 5, p. 876.)

OZÆNA.—Mr. Lennox Browne maintains that a large proportion of the cases of ozæna arises entirely from the inspissation, retention, and consequent putrefaction of the normal secretion—the condition being the direct result of long-neglected pharyngeal and post-nasal catarrh. This is, in fact, the same view as that propounded by Gottstein, and which condition the latter styles "chronic atrophic rhinitis." Mr. Browne urges with Dawosky the importance of carefully removing all crusts, and believes that the only way to remove them is by emollient post-nasal washings, vapour or spray inhalations, or inunctions. They should never be removed

by any method involving hemorrhage, which must always lead to re-formation of the crust and, by whatever process they are removed, measures should be taken to prevent their re-incrustation. Nothing is better for this purpose than an ointment of vaseline with iodoform, which he thus prescribes: ℞. Iodoform, gr. 5 to gr. 8; ether, fl. ʒ i. to fl. ʒ iss. Dissolve and add vaseline, ℥ i.; ottar of rose, ♏ v. to ♏ viii. M. In post-nasal douches he uses about five to eight grains of chloride of ammonium, on account of its largely diffusing power, and an equal quantity of borax with a little glycerine, with or without carbolic acid, to about four ounces of water at 95° F., this amount serving for two douches with his post-nasal syringe. He disapproves entirely of any of the following methods advised by Dawosky:—(1) Of plugging the nostrils; (2) of using pure glycerine, which has a powerful attraction for water, and which therefore increases the dryness already complained of; (3) of using alum, tannin, or any other astringent for the same reasons, nor does he ever recommend nasal snuffs, which he believes to be contradictory of the physiological functions of the nasal organ.

In cases of actual ulceration, with necrosis of the nasal passages (*pseudo-ozæna*), Mr. Browne does not find Condy's ozonised sea-salt sufficiently powerful as an antiseptic nasal douche, though it serves very well the double purposes of a mild antiseptic, and of increasing the specific gravity of the irrigating fluid used with the ordinary anterior nasal douche in true ozæna. He abstains from prescribing carbolic acid for this purpose, not only on account of its danger, but also because of its taste and odour, which are to many persons most objectionable. Thymol, even in the proportion of 1 in 4,000, produced smarting in the nasal passages of a much more stinging character, and of much longer duration, than that caused by any other remedy in ordinary use and similarly applied. He therefore discards it. Salicylic acid gives, in his hands, the best results. A solution of 1 in 500 makes an agreeable non-irritating and efficient gargle or nasal douche for use with the *post*-nasal syringe, but does not serve with the ordinary *anterior* douche, because the specific gravity of the fluid is not sufficiently great. The following he recommends for this purpose: Borax, 3 drachms; salicylic acid, 2 drachms; glycerine, 2½ ounces; water to 3 fluid ounces. One or two drachms of this mixture to the half pint of water, at 95° F., acts quite efficiently, whether used with the anterior or the post-nasal douche, or as a gargle. It has the advantage over and above its antiseptic qualities of being not only non-irritating or obnoxious in taste, but, on the contrary, of being even emollient, and of agreeable flavour. (Mr. Lennox Browne, Dublin Journal of Medical Science, Aug., p. 141.)

PHTHISIS.—*Inhalation of Carbolic Acid.*—The inhalation of carbolic acid has proved beneficial in my experience; and although I do not vaunt it as a specific for phthisis pulmonalis, I am certain that it has helped to cure some cases that would otherwise have died. As I commenced to use it at first on the supposition that it acted as a disinfectant and stimulating lotion to the ulcerated and diseased tissues of the lungs, I have only tried it in the second or suppurating stage of phthisis, but of course the real benefit might have been due to the destructive influence of the acid on the bacteric germs. I have observed that little good followed the inhalation unless it was used frequently, and latterly I have been in the habit of seeing that the patient performed the act of inhalation properly, as many were apt to draw the steam merely into the mouth without actually inspiring any of it. Dr. Schüller recommends a solution of benzoate of soda (2 to 5 per cent.), to be inhaled by means of a spray producer, two to four times a day, for about half-an-hour each time, while Dr. Mackenzie practises the inhalation of carbolic acid or creasote by means of a respirator containing a sponge saturated with a strong solution of the drug. I always use the inhalation of steam from a mixture of carbolic acid and hot water (℥ i to the pint), by means of an inhaler, or even a common jug. Whatever the result of a more extended trial of the inhalation of carbolic acid in phthisis pulmonalis may be, it must be borne in mind that its application in this form does not interfere with, nor is it intended to supersede, the use of constitutional and internal remedies. (Dr. R. Munro, p. 57.)

Chloride of Calcium.—In the British Medical Journal, June 1880, p. 845, Dr. Sawyer brings forward chloride of calcium as a valuable agent in the treatment of phthisis. Ten grains, given daily in water, glycerine, and milk, immediately after meals, tend to check night-sweats, to cause increase of weight, and to dry up pulmonary lesions. In the Lancet, August 1877, p. 275, Dr. Robert Bell writes, "Chloride of calcium possesses a most wonderful power in controlling, if not actually curing, many forms of tubercular disease." In this suggestive paper, Dr. Bell also gives the history of many forms of tubercular disease in which the chloride of calcium appeared to work marvellous cures. In the Practioner, October 1877, p. 363, Dr. Coghill speaks also most enthusiastically of the vast value in many diseases of this drug, especially in glandular diseases of children, typhoid and struma. In the old Edinburgh Pharmacopœia, a solution in milk is recommended. In the Lancet, September 1877, p. 448, Mr. Farrer speaks highly of the following preparation:

Carbonate of lime, ʒij ℈ij; saturate with dilute hydrochloric acid, and add water to six ounces: filter. Each drachm contains sixteen grains of the salt. Many observers believe that uterine fibroids may be cured by the drug (*vide* Medical Digest, section 1122.6). By Dr. Leared it was recommended in sarcina ventriculi (Medical Times and Gazette, May 1860, p. 401). By Rudolfi and others it has been found useful in the treatment of chorea (*vide* Medical Times and Gazette, January 1869, p. 125; December 1875, p. 663). (Dr. R. Neale, London Medical Record, July 15, p. 273.)

Plugging the Posterior Nares.—*New Method.*—Dr. Spear, in the Medical and Surgical Reporter, suggests that probably the best impromptu device for this operation consists of a piece of round fine-linked gold chain, slightly flexible and smooth, about one-tenth of an inch in diameter and an inch or more long, attached by one end to a fine waxed silk cord, a foot or more long. If such a chain be not procurable, a short string of metallic cylindrical beads, or bird-shot, compressed on a cord, or small strips of sheet-lead wrapped on a cord, might answer the purpose, the essential qualities of a nasal gravitator being smallness, smoothness, and slight flexibility. After providing an instrument, which can generally be done at any farm-house, the patient is then laid upon the back, the floor of the nose brought as nearly vertical as may be, and the loaded end of the gravitator lowered into the pharynx. Its arrival there will generally be announced by coughing, retching, or clearing up of the throat. The patient, then being brought to an erect position, easily hawks up the weight and carries it forward on the tongue, when the operation of plugging may be proceeded with as usual. The practicability of this procedure he has had occasion to demonstrate frequently, and he finds it much less annoying to the patient than Bellocq's sound or other unyielding instruments. (Dr. J. M. Spear, British Medical Journal, April 10, p. 566.)

AFFECTIONS OF THE DIGESTIVE SYSTEM.

Flatulence, Acidity, and Pyrosis.—*Glycerine.*—We have largely employed glycerine, and find it not only very useful in acidity, but also in flatulence and pyrosis, and that it sometimes relieves pain. We meet with cases where flatulence, or acidity, or pyrosis, is the only symptom, but more frequently these symptoms are combined. Some patients rift up huge quantities of wind without any other symptoms than depression of spirits; in others we get flatulence and acidity, one or other predominating; and we meet with others who

suffer from acidity, flatulence, and also pyrosis. In all these various forms we find glycerine useful, and in the great majority of cases very useful. We do not mean to say that in all cases it is superior to other remedies for these complaints; indeed, in several instances it has only partially succeeded, where other remedies at once cured. On the other hand, in some cases glycerine speedily and completely succeeded, where the commonly used remedies for acidity and flatulence completely failed. We do not pretend to estimate its relative value to other remedies; we are only anxious to draw attention to its virtues. Gas is in some instances formed in the stomach, in others in the large intestine, in some patients in both. Our observations were made on stomach flatulence, and as glycerine is so readily absorbed we should hardly expect that it would influence the formation of wind in the colon, except given in large doses, and when it acts as a slight laxative, and so expels the putrefying mass which forms the wind. In some cases it removes pain and vomiting, probably, like charcoal, by preventing the formation of acrid acids, which irritate delicate and irritable stomachs. We suggest that it acts by retarding or preventing some forms of fermentation and of putrefaction. J. Mekulics shows that glycerine prevents putrefaction of nitrogenous substances, as of blood diluted with water, which speedily decomposes at the ordinary temperature of the air. Two per cent. of glycerine retarded decomposition for twenty-four hours; ten per cent. for five days. If the fluid were placed in the hatching oven, then two per cent. retarded decomposition for several hours, ten per cent. for forty-eight hours, and twenty per cent. altogether prevented putrefaction. He also proves that glycerine destroys bacteria and prevents the formation of septic poison, though it will dissolve and preserve the septic poison itself. Dr. E. Murk finds that two to three per cent. will delay lactic fermentation in milk from eighteen to twenty-four hours. Burnham Wilmot, 1860, says glycerine preserves meat so that after several months' immersion the meat is sweet and can be eaten; and Demarquay proves that both animal and vegetable substances may be kept for six weeks to two months by glycerine. Glycerine, however, does not prevent the digestive action of pepsin and hydrochloric acid; hence, whilst it prevents the formation of wind and acidity, probably by checking fermentation, it in no way hinders digestion. We administer a drachm to two drachms either before, with, or immediately after food. It may be given in water, coffee, tea, or lemon and soda water. In tea and coffee it may replace sugar, a substance which greatly favours flatulence, as, indeed, does tea in many cases. In

some instances a cure does not occur till the lapse of ten days or a fortnight. (Drs. Ringer and Murrell, p. 90.)

HEMORRHOIDS.—*Crushing.*—The one satisfactory result observed in all cases treated by crushing was that the subsequent pain was quite an insignificant matter. It is not wished to imply in this statement that no one ever complained of pain; but in contrast to the pain attendant on ligature, or that noticed after the application of the hot iron, certainly that which has been observed after this system of rapid crushing, may almost be said to be a *minus* quantity. One patient complained of pain for about three hours. In all cases patients have expressed themselves free from severe pain, and many have hardly complained of any after an hour or two. One, who had some years previously undergone an operation by ligature, expressed his extreme gratification at the almost entire absence of even discomfort after the first effects of the ether had gone off. The application of the heated iron to the surface of a fresh cut wound must not only necessarily make it a very painful one, but burning the surface necessarily converts it into a more extensive slough, which has to be thrown off before healing commences. The slough to be shed after the application of the clamp now used by me, is very thin and quite superficial, and is soon cleared away. The œdema following this method of relief is but little compared to that which is often observed to follow the application of the ligature or the cautery. Having now tested all these methods of treatment not a few times, I cannot but express my very strong conviction that, compared with the results of ligature or cautery, the pain and subsequent discomfort after crushing are really trifling. But apart from the question of pain or bleeding, the operation itself is rendered very simple by the use of this kind of clamp, and in that point alone we venture to think it will be considered an improvement by those who care to test it for the removal of hemorrhoids. The process of the application of the clamp remains to be described. The patient suffering from hemorrhoids, being prepared for the operation in the usual manner, is to be placed under the influence of ether. He is then turned on his left side; the right leg to be well flexed and fixed with a strap, which is to be carried under the knee and round the neck. The pile to be removed is to be drawn well down by pronged hook, or forceps. The clamp is then to be applied to the base of the pile, and at once tightly and firmly closed by the action of the screw at the end of the handles. The portion of pile which protrudes *inside* the lips of the clamp is then to be removed by a pair of curved scissors. The clamp may afterwards be retained, still grasping the stump of the pile for any time the operator may

consider desirable. Our usual custom is to retain it from half a minute to a minute. If the pile be large and thick it may be well to retain it for a rather longer period. This process is, of course, to be repeated according to the number of masses to be got rid of. (Mr. George Pollock, p. 160.)

If the clamp, after being firmly applied, be allowed to grasp the pile for about two minutes, all oozing may be avoided, and even if it should occur (which I feel confident would not be the case), the application of the torsion forceps would sufficiently control any bleeding. When the thin shred (or fringed remnant) which the clamp leaves, and which is extremely dense, and no thicker than a stout piece of paper, drops off, the surface of the part operated on is on the same plane as the surrounding parts (unlike cases where other clamps have been used). By means of one crush the whole operation is at an end, whereas by ligature or with other clamps and actual cautery great care and very skilful treatment are absolutely necessary; for if in the former case the mucous membrane be not sufficiently snipped, the patient will experience acute and almost indescribable suffering, many instances of which have come under my notice. The bleeding very often conceals the parts to be snipped before the ligature is applied. As a substitute for any anæsthetic, the part to be operated on might be frozen by means of the ether spray; for the interval between the application of the clamp and the closing of its jaws is momentary, and all sensation of pain avoided. I make these remarks by way of suggestion, as I have had no practical experience on this point. I may also suggest that it would, perhaps, be better to cut off the pile, while it is in the grasp of the clamp, with an ordinary scalpel instead of with scissors curved on the flat. (Mr. R. F. Benham, p. 166.)

Tying Hemorrhoidal Tumours.—The tumour as a general rule, is never seized by tenaculum or forceps and pulled down; for if this is done a portion of the mucous membrane, to which the tumour adheres, comes down with it, and is almost certain to be included. Hence additional pain, protracted suffering, and more or less ulceration would necessarily follow; for the operator cannot distinguish the true base of the tumour when drawn down in this manner, all the parts having generally the same appearance. I always require my patients to extrude the tumour simply by defecating efforts, or by the effects produced by an aperient or a relaxing enema. If these means fail to protrude the tumour, I employ a bivalve anal speculum, arranging it so that the tumour shall fall between its blades, when, with suitable instruments, it can

be ligated within the canal just as easily as if it were external or extruded. I scarcely ever ligate more than one tumour at one time, and I use a fine soft silk ligature, well waxed, with scarcely any twist in it, somewhat like floss or dentists' silk. For, in proportion to the large size, the hardness and stiffness of the ligature, will be the increased pain which it will cause, and the length of time it will take the tumour to slough off. I am careful so to adjust the ligature as to exclude everything but the foreign body itself, and only make the ligature sufficiently tight to cut off the circulation—nothing more nor less. This fact can be known by the appearance of the tumour as it is tightened. I am also very careful not to place the ligature very close to the base of the tumour, as this produces more pain and is not any more effectual in removing the whole of it. The small portion of the base below the tumour will sooner or later slough off or disappear in some way. When the tumour is very large, or too large for one ligature, I divide it into two or more sections, according to its size, and multiply the ligatures, including but a small portion in each. This is done by arming a suitably curved needle with a double ligature, passing it through the tumour a little above its base, and, if necessary, re-passing it, and tying each ligature separately, thus including in the stitches every part of the tumour, and underlaying it, as it were, with a double uninterrupted suture. When any part of the tumour is covered with skin or muco-cutaneous tissue, I usually incise this upon the same circle that is to receive the ligature afterwards, by which more or less suffering is avoided. I sometimes, when the tumour is entirely external and covered with skin, and objection is made to the knife or curved scissors, ligate subcutaneously, which causes it to shrivel and gradually disappear. By this operation the integument, of course, is not interfered with, and much suffering and inconvenience are avoided. The subcutaneous ligation of external hemorrhoids consists in encircling the base of the tumour with a ligature passed immediately beneath the skin. This is accomplished by the use of a needle describing a considerable curve, penetrating the tumour at a suitable place, and carrying the ligature subcutaneously half round the same. The needle is then to be brought out at this point, and re-introduced at the point of exit, and carried round the other half to the original point of entrance, and then tied. If the tumour is large it may be ligated in two or more sections. I sometimes employ *temporary ligation*—that is, suffering the ligature to remain upon the tumour for fifteen to thirty minutes only, and then removing it and replacing the tumour. This method, however, is only suitable in case the tumours

are internal, and of a soft spongy texture, similar to those to which nitric acid is especially applicable. On examining the tumour a few days afterwards, it will be found to be smaller, and ecchymosis will be visible in all parts of it; and about the fifth or eighth day it will have entirely disappeared, with scarcely any pain or inconvenience during the whole process. (Dr. Bodenhamer, p. 167).

Intestinal Obstruction.—*Colo-puncture.*—In a curious case of obstruction related by Dr. M'Gown, Dr. Cameron thrust a trocar and canula into the middle of the transverse colon; the gas blew off for a few minutes, and the bowel was about half emptied of gas, when the bowel was strongly drawn to the left side by its own peristaltic action; the canula was laid down on the walls of the abdomen, and liquid fæces began to escape from the canula. Dr. Cameron placed his thumb on the mouth of the canula, and then injected a small quantity of tepid water through the canula into the bowel. He now withdrew the canula, and placed a small piece of adhesive plaster over the wound, and we left the patient in bed. We did not consider the operation very successful, as the gas was only partly liberated. But now comes the wonderful part of the case. Three hours after the operation the patient had a very copious discharge from the bowels of dark clayish liquid fæces, followed by a second, one hour after the first. Seven hours after the operation, a large quantity of gas was passed per anum, and by next morning the abdomen was quite flat, and the distension completely gone. The kidneys now began to act vigorously. The ordinary chamber utensil was filled three times in sixteen hours; and, at the end of three days, all the œdema in the limbs had disappeared. The heart's action was now greatly increased; the pulse rose from 48 to 70 per minute. The patient has improved every day since the operation, and is gaining flesh rapidly. Wherever the strangulation existed, I am of opinion that the bowel liberated itself at the time of the operation. (Dr. J. M'Gown, p. 92.)

Prolapse of the Rectum.—M. Vidal lately read, before the French Academy of Medicine, an account of three cases of prolapsus recti, which he had successfully treated by the subcutaneous injection of ergotine. The first case was that of a man aged 39, who had suffered from prolapsus for eight years. After five injections of fifteen drops of solution of ergotine, a period of about two days intervening between the injections, the mucous membrane scarcely protruded at all. After the eleventh injection, it only came down during defecation, and returned spontaneously. The total number of injections made was twenty-two. Four years had elapsed,

and the man remained perfectly well. The second patient, a female aged 64, was cured after twenty-four days' treatment, and, during the two-and-a-half years since the operations, there had been no return. In the third case, a female aged 45, who had suffered for two years, was cured in fifteen days, by six injections of twenty to twenty-five drops each. The solution used consisted of fifteen grains of Bonjean's ergotine to seventy-five minims of cherry laurel-water. The injections were made at the distance of one-fifth of an inch from the anal orifice. Acute pain always followed, accompanied by contraction of the sphincter, which lasted several hours. Several times, an injection of twenty-five drops of the solution produced spasm of the neck of the bladder and retention of urine for eight to ten hours. In no case was local inflammation or abscess caused by the ergotine. (M. Emile Vidal, British Med. Journal, April 10, p. 558.)

Tapeworm.—*Cus.*—Cus, one of the most certain of tænicides for tapeworm, is prepared, unimpaired in its strength and in a form which does not excite repugnance, by treating ℥ss. of fresh powdered cus with ℥i. of hot castor-oil, and afterwards with ℥ij. of boiling water by displacement, expressing and by means of the yolk of an egg combining the two percolates into an emulsion; adding gtt. xl. of ether, and flavouring with some aromatic oil. This emulsion is to be taken at one dose early in the morning, after a previous fast of nearly a day. The worm is usually expelled dead after about six to eight hours. (Dublin Journal of Medical Science, Sept., p. 288.)

DISEASES OF THE URINARY SYSTEM.

Bright's Disease of the Kidney.—My own practice is usually to give the compound jalap powder in doses of gr. x-xxx every few hours until purgation is established, which is followed up by cream of tartar solid, in electuary, in gr. xx doses, and finally, when diuresis occurs, as often happens in a few hours, it is kept up by the cream of tartar in solution given alone, or with orange or lemon peel (imperial drink) indefinitely, and with the happiest results. I think it is not too much to say that I have never seen any injurious result whatever follow from this mode of treatment, if watched with ordinary care. I therefore much prefer it on the whole to the treatment by digitalis, or by any vegetable diuretic, which might, under certain circumstances, prove poisonous if long continued; and I need not say how much I prefer it to continuous drastic purgation, however accomplished, in a class of cases so often tending to death by exhaustion.

In almost all stages of the disease there has been an undue tendency to depreciate or exclude diuretic remedies, and these, judiciously employed, without pretending to an absoute supremacy, are at once the safest, and in many cases the most effectual of the means of dealing with dropsical symptoms, while, as Dr. Christison has pointed out, their legitimate function is not merely to get rid of a single symptom, but by aiding the natural process of excretion by the kidneys, to ward off the dangerous accumulations in the blood, which lead in time to what is called uræmia. To restore by remedies this natural function, we must needs employ, in any case, methods of elimination that are more or less closely allied in their action to the physiological processes which it is desired to arouse and quicken; and hence, as I venture still to be of opinion, the experience of ages, here quite in accordance with a sound theory, has practically demonstrated the advantage of employing in such cases the cream of tartar in its solid as well as liquid forms of administration, followed or accompanied by other mild diuretics, or by digitalis. (Dr. W. T. Gairdner, p. 99.)

Chronic Catarrh of the Bladder and some forms of Acute Cystitis.—According to Th. Deecke lactic acid seems to have almost a specific effect in counteracting the decomposition of urine. Its antiseptic action is best shown in the proportion of 1 per cent. Deecke gives three times a day and injects into the bladder a solution of $\frac{1}{2}$ to 1 per cent. (Dublin Journal of Medical Science, June, p. 527.)

Chronic Cystitis.—*Antiseptic Injections.*—No plan of treatment has answered so well in my hands as the daily introduction, once or twice each day, into the viscus, after the residual urine has been drawn off by a catheter, of a weak solution (1 in 100) of carbolic acid, at the temperature of 98. The bladder appears to be singularly tolerant of the solution, and very great relief (with sometimes absolute cure) has followed on this plan. But it has seemed to me that it is of all things important that the solution find its own way, *slowly* and steadily, into the bladder. To ensure this, I reject absolutely any syringe, and simply attach to the end of any catheter of proper size, introduced into the bladder, a piece of India-rubber tubing, at least six inches long. To the distal end of this tube is attached a small glass funnel, into which the lotion is slowly poured. The flexible tube receives the weight from above, and, loosely held in curved form, allows the lotion to trickle slowly along the catheter. The funnel must be maintained at the height just necessary to allow this. (Dr. W. Newman, British Medical Journal, May 15, p. 735.)

Copper Test Capsules for Sugar.—The thanks of the profession are due to Dr. Pavy for the suggestion which has rendered the application of the copper test for sugar more convenient and its constituents more stable. The substitution of the glass stopper for the sealing-wax cork will, no doubt, in great measure prevent the damp from acting on his "test pellet"—the only objection that has been hitherto brought against it. At the same time it must not be overlooked, that it may happen that the stopper will not be always replaced immediately. Moreover, a glass-stoppered bottle is not a very convenient article to carry about with one. I have, therefore, ventured to suggest an improvement on Dr. Pavy's "pellet," by enclosing a small quantity of Fehling's solution in hermetically-sealed glass capsules, each containing about one cubic centimetre of the test solution. Air being thus excluded, the solution will keep almost an indefinite time. The size of the capsules being small, two or three can be conveniently carried wrapped in a bit of cotton-wool either in the ordinary pocket-case or waistcoat-pocket, without fear of breaking. They are made by Mr. Martindale, of 10, New Cavendish-street. The test capsules are an improvement on the fine tubes that have been used for the same purpose for some years, because from their size and shape they are less likely to break, and are therefore more portable. (Mr. C. H. Ralfe, Lancet, July 31, p. 192.)

Diabetes.—*Ergot.*—Ergot is a remedy of some value in diabetes. In a case recorded by Dr. Hunt, of Wolverhampton, it produced very beneficial results. At the commencement of the treatment when the patient was allowed an almost unlimited diet, subsequently to a period of strict dieting, both the amount of urine passed was very much diminished, and the specific gravity was much reduced. At a later period of the case when the ergot was left off but the dieting continued, the patient lost ground, but improved on continuing the medicine. One drachm of the liquid extract may be given three times a day. (Dr. J. W. Hunt, p. 103.)

Diuretic Effects of Citrate of Caffein.—My experience of the action of caffein leads me to believe that in many cases of œdema and ascites from various causes it will set up a diuresis when potent drugs of its class have quite failed to act upon the kidneys, though at times of course it will fail where other diuretics succeed; but it has certain properties which limit its utility. The diuretic effects of caffein seem to depend in part on the influence which it exercises on the general circulation, in part on a specific action which it has on the kidneys. Unlike digitalis, it has little, if any, influence

on the vagus, but it resembles digitalis in directly stimulating the heart and increasing the blood pressure. It probably augments the vascular tension too, by causing contraction of the small arteries. Its administration presents a few disadvantages. It sometimes readily causes sickness and headache, which may, if the dose given be large, produce considerable discomfort. I have known troublesome palpitation induced when large doses have been persevered with ; rarely palpitation is brought on by doses too small to cause diuresis. (Dr. D. J. Leech, p. 345.)

Gleet and Stricture of the Urethra.—*Treatment of Gleet, and Prevention of Stricture by Irrigation of the Urethra.*—If the urethra at, and posterior to, the bulb (excluding the prostate) is the seat of the chronic inflammation we call "gleet," how utterly inert our treatment of it must be by injections as usually and popularly practised. For some time past I have been employing in the treatment of gleet a very thorough irrigation of the urethra throughout its whole length. To effect this with the urethra I make use of a small Higginson's syringe, and a sufficiently resisting vulcanised india-rubber catheter. I direct the patient to denude himself of his nether garments, and, seating himself in a chair with his pelvis inclined forwards to the edge, to introduce the soft catheter and gently pay it into the urethra, having previously anointed it with some vaseline. If the patient finds that he can introduce and retain more easily a stiffer catheter, he may substitute one of the French instruments in the same way, of the required length, and size, taking care that the eye is within half an inch or thereabouts of the end. Having done this, he attaches the catheter to the small Higginson's syringe, which is connected with a tumblerful of the fluid to be used, tepid. I generally make use of the sulpho-carbolate of zinc, in the strength of about half a teaspoonful to a pint of water. The patient steadying the catheter in his urethra with his left hand (not squeezing the meatus around it), slowly compresses the ball of the syringe with his right hand, the vessel containing the fluid to be injected being placed by his right side, or attached, as it may be done by a bottle arrangement, to the feeding-pipe of the syringe. In this way the patient is directed to continue using the apparatus until the urethra has been completely washed out ; the fluid, after it has circulated between the walls of the urethra and the catheter, escaping through the meatus, where it is received into some convenient receptacle. The catheter should be six inches in length, and be completely passed into the urethra, merely allowing room for the connection with the syringe-pipe. The catheter should not be larger than a

No. 6 (English guage), so as to allow plenty of room between it and the walls of the urethra, in which the injected fluid can circulate. The eye in the catheter should not be too near the end, or too large, and its edge should be bevelled so as not to scrape the urethra. For smoothness in introduction, Tiemann's (of New York) velvet-eyed india-rubber catheters are a great improvement on the English make, where the eye of the instrument is punched out without being bevelled. Whilst injecting the fluid its escape may suddenly be stopped for a few seconds; the doing of this forces the fluid into the small lacunæ of the urethra, and so cleanses and medicates them. The quality of astringent in the fluid should not be too great: to cleanse and astringe without paining, or even smarting, is what is required. The operation should be repeated at least twice in the twenty-four hours. The appliances used are so simple, that they can be brought into action in the course of a patient's ordinary bathing arrangements without inconvenience. I mention sulpho-carbolate of zinc as being the most generally appliable and useful astringent for these cases. Sulphate of zinc, borax, acetate of lead, quinine, and carbolic acid, all have their uses, according to circumstances, in these cases. (Mr. Reginald Harrison, p. 201.)

Stricture of the Urethra.—The most important changes in relation to the treatment of stricture of the urethra, during the last thirty years, in this country, may be classified under five heads. 1. A general recognition of the principle, that a delicate and gentle manipulation of any instruments in the urethra, is alone trustworthy or permissible, in the place of that which was formerly greatly prevalent—viz., that urethral obstruction might often be overcome mainly by force. If there was one thing more than another in the treatment of stricture which, at an early date, appeared to me unwarrantable, not to say shocking, it was the sight of a surgeon, firmly grasping a solid instrument and pressing its point with rigid arm against an urethral obstruction until something gave way, and the point was made to advance—somewhere. From the earliest time to the present, I have invariably taught, not merely that a narrow stricture can only be traversed by gentle means, but that nothing prevents success so much as a deviation from this rule. 2. The substitution of very pliable and taper instruments for silver and stiff gum-elastic instruments in much of the treatment, both in ordinary and in continuous dilatation. The substitution of modern flexible instruments, chiefly of French origin, for the silver catheters almost invariably used thirty years ago, when the old wax or plaister bougies had fallen, somewhat

undeservedly perhaps, into disrepute, has been an advance of enormous importance. 3. A more general acceptance of the doctrine, that—given time, patience, and gentle handling—very few strictures should be met with which cannot be fairly and successfully traversed by an instrument passed through them into the bladder. At the same time, an undoubted improvement is to be noted in the mode of operating for those exceptional cases in which the surgeon fails to accomplish that object. Almost any stricture, however narrow, if urine passes outwardly through it, is permeable also to instruments in the hands of a careful, patient, and practised surgeon—provided only there is no crisis of actual retention present demanding immediate relief. The gain accruing to the patient through this doctrine has been very great: since, thirty years ago, a dissection through the perineum for so-called "impermeable stricture" was a comparatively common operation in our hospitals; and one, moreover, which was frequently fatal. Very rarely, indeed, ought such a proceeding to be heard of now, since, with time and patience, a fine instrument can almost invariably be carried safely through any stricture into the bladder. 4. A more general acceptance of the doctrine, that dilatation of the urethra, whether with or without incision, may be carried with advantage to a somewhat higher degree than had for some time previously been regarded as desirable. 5. The substitution of internal urethrotomy in some form for the application of caustics, and for external urethrotomy on a guide. I must also oppose the doctrine that stricture of the urethra is permanently cured by complete division of all the diseased tissues affecting the passage. I have seen too many examples of return of narrowing in cases thus operated on, to admit that at present we possess any certainty of being able so to act on a confirmed organic stricture, as to ensure its non-appearance in after-life. Further, I have carefully followed many of Syme's cases of external division in his and in my own hands, where the diseased structures constituting stricture have been entirely divided, and in a way more certainly complete than any internal urethrotomy can offer; and am compelled to avow that, in very few instances indeed, has the thus divided stricture not reasserted itself after the lapse of time. Nevertheless, it is an important truth that, when any portion of the stricture escapes division, the narrowing speedily returns. For that operation, I have myself substituted internal urethrotomy in the treatment of obstinate cases. All these changes may, and, I think, will be generally accepted, as illustrations of advance in the treatment of stricture. (Sir Henry Thompson, p. 180.)

The principles which govern a sound procedure are more essential points for the surgeon to discover and to teach, than a consideration of small details. These principles may be briefly stated as follows. 1. The necessity for a physical examination before operating, to detect and estimate the narrowed portions of the urethra. This is best accomplished, in my opinion, by means of a series of metal bulbs on slender stems, taking care not to regard as diseased changes those points at which the urethra itself is naturally only slightly dilatable. These bulbous exploring sounds I have invariably used, advocating them as essential to diagnosis in my first work, twenty-six years ago; and I still prefer them to any other, as safer, less irritating, and not less efficient, than more complex instruments which have been devised. 2. The necessity for accomplishing a complete division of all the morbid tissue constituting the stricture, by an incision carried through it; no matter what part of the urethra, or how much of it, is involved in the disease. As a general rule, this is, I think, most efficiently completed by a slender blade, carried beyond the stricture, and made to cut from within outwards; this latter proviso being, however, an open question. The important point, however, is, that any alleviation of the patient's condition attained by operation will be transitory if any part of the narrowing be left undivided. 3. I regard it as essential, after such division, to place at once a full-sized catheter for some hours in the bladder, to ensure a free outlet for the urine, and prevent all possibility of extravasation of urine into and through the incisions thus made. 4. The necessity for passing full-sized bougies subsequently, at occasional intervals, in order to effect free distension of the walls of the urethra, which lie in almost constant apposition, and so to prevent the reunion of divided surfaces by the first intention. The foregoing may, I believe, be held to embody those general principles which most surgeons agree ought to guide us in practice. (Sir H. Thompson, p. 187.)

In respect of the instrument to be employed, I unhesitatingly avow a preference for one which, in principle of construction, resembles a slender knife with a long handle, in order that it may act completely in obedience to the impetus given to it by the hand. Concealed within a bulb at the end of the instrument is the blade; so that, before this is unsheathed, the urethrotome itself is an efficient bulbous-ended explorer (like those already employed in the previous exploration), and is used as such to identify the stricture again at the very moment of operating. With such an instrument, the incision is directed solely by intelligence, and is limited or extended according to the sensations experienced by the

operator's hand, of resistance or the reverse; just as happens in the analogous instance of division of tissues which are not visible, in the case of contracted tendon in club-foot. (Sir H. Thompson, p. 188.)

Modified Perineal Operation.—I open the urethra by puncture, or by very small incision, immediately in front of the prostate gland. I run a short elastic catheter along this wound to the bladder. I leave the stricture quite untouched for ten days more or less, during which the urine flows entirely by the perineal catheter. At the end of this time, I find the stricture sufficiently relaxed for me to begin its dilatation with a middle-sized instrument; and I thus obtain all the advantages assigned to the severer and more difficult measure, while adopting an operation of extreme slightness and security. (Mr. John Simon, p. 190.)

Stone in the Bladder.—The old operation of lithotrity will now only be required for small calculi, which can be pulverised in a few minutes, and for which aspiration would be unnecessary. Lithotomy will only be demanded for very large, hard stones; big, soft calculi can be most safely disposed of by lithotrity and external urethrotomy at one sitting. No kind or amount of renal disease forbids Bigelow's operation if the patient be physically fit for it. In the treatment of stone in the bladder when it occurs as a local formation secondary to the diseased bladder, of which it was not the *cause*, but the *result*, the following pathological facts must be borne in mind:—Firstly, the condition of the bladder is such that, even if the calculus be completely removed by crushing and aspiration, some local irritation will remain, the alkalinity of the urine will persist, and a speedy recurrence of stone take place; secondly, the condition of the prostate in these cases not only does not improve, but gradually becomes more troublesome as age advances, and auto-catheterism is rendered increasingly difficult. The following indications have to be carried out:—1. Remove the stone. 2. Cure the cystitis. 3. Give the patient a short and ready route to his bladder for the catheter. A case such as the above is in this country too often relegated to lateral lithotomy, which is unnecessary and uncalled-for, for directly the surgeon had grasped the stone with his forceps it crumbles to pieces, and the operation, instead of being a speedy one, becomes a prolonged one, for he has to extract some twenty or thirty pieces, during all which time the man's engorged prostatic plexus of veins pours out blood like water. In devising an operation for such a case, we must take cognisance of the following facts. The stone is soft, and can on the slightest pres-

sure be reduced to fragments small enough to pass along the normal urethra. An incision into the bladder is therefore unnecessary; but we want to cure the cystitis which caused the calculus, and this can only be done by allowing the urine to run out as fast as it enters the bladder, and so give it a physiological rest. We require further a short route for the catheter to go into the bladder. External urethrotomy fulfils all these conditions. All we have to do is to reduce the stone to fragments with the lithotrite, extract them through the perineal puncture, and wash out the bladder, leaving in a tube for drainage: the small puncture being kept permanently open for catheterism. It will at once be seen that whereas lateral lithotomy was a dangerous operation, and the wound could not be utilised for future catheterism, this combination of mine is attended by but little risk, comparatively speaking, and the aperture can be made useful for catheterism. What is it that makes lithotomy a perilous operation whilst external urethotomy is not? It is because the former is an *intra-pelvic* operation, whilst the latter is an *extra-pelvic* one. Thus, therefore, by reducing the lateral lithotomy to a mere external urethrotomy, we shall diminish the rate of mortality correspondingly. I believe I was the first to introduce this combination, and in the unpromising cases in which I performed it, it was followed by the best results. But it may be asked, Is not this the perineal lithotrity of Dolbeau? It is not. There are two objections to this operation. In the process of dilating the urethra with instruments the urine always escapes, and the canal is very likely to be injured. The stone has consequently to be broken up in an empty bladder, which is a difficult and dangerous procedure if it be large, and during the long and tedious process the patient is bleeding, and no means can be taken for its arrest. Dolbeau cut first and then crushed the calculus through the perineal wound. I, on the contrary, crush first through the penis, and then cut. The operation of breaking up a large stone during lithotomy into several small ones is of ancient date, and is called "fragmentation" by the Americans, to distinguish it from lithotrity, which it is not. I consider therefore that the combination of a perfect lithotrity at one sitting, followed immediately by external urethrotomy, is the proper treatment for large phosphatic calculi in men who are the subjects of chronic cystitis, and who are obliged to use the catheter; for we remove the stone at a minimum risk, we give the bladder the physiological rest it requires, and we convert penile catheterism, which in these cases is often a painful, bloody, and difficult process, into perineal instrumentation, which is free from all these annoyances. (Mr. W. F. Teevan, p. 172.)

VARICOCELE.—*Radical Cure.*—Try the plan of subcutaneous division of the veins by means of a platinum wire heated to a red heat by electricity. The procedure is very simple. First, feel for the vas deferens, and grasp the veins in front of it, and nip in the scrotum with the left thumb and forefinger; transfix the scrotum at this spot between the duct and the veins with a narrow bistoury, and pass a needle armed with a platinum wire in the track of the knife; then return the needle through the same apertures, but this time in front of the veins between them and the skin. Of course, if the vas happen to be in front of the veins, you modify the procedure a little. In this way you have the veins in a loop of the wire. It is better to make a puncture with a knife rather than merely to transfix with the needle, for the veins are looped up cleaner, there is not the same liability to include a portion of the skin in the noose as in the latter plan. Then attach the ends of the wire to the écraseur, and connect with the battery, using sufficient cells to cause a faint hissing noise; one cell of Grove's battery, or at most two, is sufficient. This step must be done deliberately; I have taken as long as five or six minutes over it. To protect the skin from burning, let some cold water trickle over it while the wire is burning its way through the veins. The after-treatment consists in perfect rest in bed for a few days, with the scrotum supported on a broad strip of strapping fixed across the front of the thighs. I have three times operated without anæsthesia, but the pain may be severe, and I prefer to have the patient under the influence of ether. After recovery from the anæsthesia there is an entire absence of pain, and this perfect freedom from spontaneous pain continues uninterrupted throughout the convalescence. A few hours after the operation the knobby feel of the varix is replaced by a soft even swelling, which lessens and hardens, and at the end of forty-eight hours is usually to be felt as a hard lump, about the size of a big marble. This is tender on pressure. By the end of a week it has lost its tenderness, and has shrunk to three-quarters its original size. The veins below can still be felt full, but not compressible, the blood in them has by that time coagulated, and they become smaller and firmer, until ultimately a small pea-like induration in front of the vas is all that is left, and even this may disappear, and no trace of the varix or operation be left. I have employed this method eight times, each time the varix has been cured, the symptoms complained of relieved, and no mischief to the testicle has followed the operation. (Mr. A. Pearce Gould, p. 204.)

AMPUTATIONS, FRACTURES, AND DISEASES OF THE BONES, JOINTS, ETC.

ABSORBENT COTTON-WOOL AND GAUZE ANTISEPTIC DRESSINGS.—I have employed Robinson's absorbent cotton-wool and gauze, as introduced to my notice by Mr. Sampson Gamgee, and I have had results as uniformly satisfactory as those from Mr. Lister's gauze were disappointing. I have now had fifteen ovariotomies, two abdominal explorations, and four excisions of the breast, in which I have used these absorbent dressings without any antiseptic preparation; and not only have all the cases recovered, but they have not given me five minutes' anxiety about their recovery, and the pus, if it could have been collected from the whole twenty-one cases throughout their course, would not have filled a table-spoon. It is, therefore, to me conclusively proved that our improved results in abdominal surgery do not depend on Mr. Lister's dressings. (Mr. Lawson Tait, Lancet, April 24, p. 666.)

ANTISEPTIC SURGERY.—*Acetate of Alumina.*—The method of operating with acetate of alumina as an antiseptic, is as follows: The skin is first washed with 5 per cent. carbolic acid solution in the ordinary way and dried. The reason for this is that acetate of alumina is not saponifiable. Carbolic acid has also to be used for disinfecting the instruments, as the acetate solution is so acid that it blunts and corrodes them. For every other part of the operation the acetate of $2\frac{1}{2}$ per cent. strength is alone used. Owing to the admixture of steam the actual strength of the spray which reaches the wound does not exceed 1 to $1\frac{1}{2}$ per cent.; but this answers all purposes. The acetate spray never causes anæsthesia of the operator's hands as carbolic acid is liable to do, but it makes them rather rough. Prof. Maas uses catgut for ordinary ligatures, and Czerny's antiseptic silk for atheromatous vessels or for deep-seated or large arteries. The sutures and drainage-tubes are inserted in the ordinary way. For the dressing, the wound is first covered with "protective," and then with loosely folded pieces of gauze, which are pressed firmly over and around it. The gauze has previously been soaked for a long time in 5 per cent. acetate of alumina solution, and wet compresses of the same, one and a half to two metres long and about twenty centimetres broad, four times folded, are used to keep the dressing in its place. From four to eight such compresses are generally needed, the rule being, *e.g.*, for an excision of the knee, to carry the dressing from the lower third of the leg to the upper third of the thigh. The whole is covered with gutta-percha tissue to prevent evaporation,

the edges being surrounded with strips of 10 per cent. salicylated wool. To keep everything in place a calico bandage soaked in $2\frac{1}{2}$ per cent. solution of the acetate is used. The acetate of alumina bandage is cheaper than Lister's carbolic gauze. The colloidal alumina is sold by Löwig and Co. at forty-five shillings the hundred kilogrammes, and dilute acetic acid is also cheap. The compresses can be used over and over again after boiling and re-washing, and they are easily prepared. They adapt themselves well to any part of the body, and can be made to exert an even, elastic pressure on the wound. Eczema never occurs beneath them. (Editor of Medical Times and Gazette, p. 329.)

ANTISEPTIC SUTURES.—If strapping is required, common adhesive plaster may be rendered antiseptic by dipping it for a second or two in a watery solution of the acid, and it is most convenient to have the lotion hot (say one part of one to twenty with two parts of boiling water), so that the strap is warmed at the same time by its immersion. It can then be applied effectively under the spray, which should always be used in changing the dressings of a stump till the wound had become superficial. (Prof. Lister, p. 151.)

Carbolised Silk Sutures.—Admirable as wire is for certain cases, yet its rigidity, and the fact that all metallic sutures are apt to catch in the antiseptic dressings, led Mr. Lister to take steps for introducing the ordinary surgical silk into his system, and this he was enabled to do by having the silk *carbolised*, by which process the interstices among the silk are filled up with wax and carbolic acid. Prepared in this way carbolised silk showed itself preferable to catgut as "less amenable to absorption," and "very superior to wire, not only on account of its perfect suppleness, but because its actively antiseptic character ensures absence of putrefaction in the track of the stitch." Silk prepared in this way will be found to be quite saturated with carbolised wax, and to possess all the unirritating qualities of wire with the softness and other advantages of silk. Any of the mixture of bees' wax and carbolic acid that may be over can be covered up and kept up for future use, as it can be remelted at any time, and thus is always at hand. If necessary, a little fresh carbolic acid can be added on any of these occasions, to replace any lost by volatilisation. Though the preparation of the carbolised silk is neither a difficult nor a lengthy process, yet the surgeon will find it a saving of time to purchase it ready prepared, as it is not a very expensive item. It costs about 1s. 4d. per hank of twelve yards for any size, with a certain percentage off to hospitals. It can be

obtained from Mr. Gardner, 45, South Bridge, Edinburgh, at that price, though he keeps prepared only a thick and a thin variety of silk, as being the sizes most generally useful.

Catgut Sutures.—These are sutures made of the carbolised gut used for ligatures, and very serviceable they are for cases where they are suitable, but they are very soon absorbed, and they will not last beyond a few days. As Mr. Lister says, "Any one desirous of convincing himself of the absorption of catgut has only to employ it for sutures, and treat antiseptically, and in a few days he will find the knots come off with a touch, the part of the stitch embedded in the tissues having disappeared. This circumstance renders the catgut unfit for sutures intended to retain their hold for a considerable period." It is, however, this power of being absorbed that has given catgut its wide range of utility, especially for uniting deep-seated tissues, where it can be cut short and left undisturbed, the parts above it being allowed to heal.

Horse Hair Sutures.—To render horse hair antiseptic it merely requires soaking for a few minutes in one to twenty carbolic lotion. If placed in some of that lotion at the commencement of an operation it would be quite ready for use when the time for stitching had arrived. Some consider it advisable to remove from the horse hair any grease by steeping it in an alkaline solution, but this is quite as unnecessary as cleansing the skin, previous to an operation, with soap and water followed by ether. The one to twenty lotion will render it perfectly safe as regards freedom from putrefactive agencies. (Dr. George Beatson, p. 151.)

Aspiration of Joints.—With the great advances in the treatment of wounds, and the introduction of novel mechanical appliances, joints like the serous cavities have been brought into the region of practical operative surgery. Professor Lister has demonstrated the propriety, under certain circumstances, of making free openings into articulations, and of securing the thorough escape of all inflammatory products within them; nor need the mobility of the part be endangered by the procedure. Ogston and others have shown how articular processes can be sawn off with impunity, a perfectly movable joint being left. But we desire here to call attention to the far simpler, safer, and more widely applicable operation of aspiration of joints, which has now been very often performed with the best results, and without any serious consequences. The questions that arise in connection with this operation are, What can be attained by it? What are its dangers, and how are they to be avoided? And what are the indications for its performance? Can a joint, for example

the knee, be emptied by the aspirator? Undoubtedly it can. What are the practical advantages of the treatment by aspiration? The first is the relief of pain, which is often very severe where a joint is much distended. This tension also leads to a persistence or exaggeration of the inflammation, and possibly to its extension from the synovial membrane to the ligaments and cartilages, and if prolonged causes a gradual yielding and relaxation of the ligaments, and subsequent weakness of the joint, while the maceration in inflammatory fluid may interfere with the nutrition of the articular cartilage. The time that can often be saved by this method is also a valuable consideration. The dangers to be feared are, on the other hand, trifling; all the joints that any surgeon would think of aspirating are easily punctured without risk to any artery or important structure; if the instrument is used with care there need be no fear of injuring the cartilage with the end of the needle or trocar, and as nothing approaching a vacuum is produced in thejoint, there is no liability to suction of air into it when the canula or needle is withdrawn. Indeed, if the instrument be clean, and employed with only ordinary care, there need be no hesitation in resorting to its use. (Editor of Lancet, p. 121.)

Carbolised Catgut Ligatures.—It would almost be as well if each surgeon prepared his own ligatures, for then he would know exactly what he was using, whereas when he purchases them he is quite at the mercy of the instrument maker who sells them, and who may, from mere ignorance or inattention, furnish him with ones that are made from *unsatisfactory gut* or are *unreliable from not having been steeped the statutory time in the emulsion.* Mr. Lister gives this warning as to the necessity for having the catgut ligatures properly prepared: "It is of the utmost importance that the catgut should be rightly prepared, for, if merely imbued with an antiseptic salt, it is utterly unfit for surgical purposes, becoming soft and slipperywhen moistened, so that it will neither bear the requisite strain nor keep its hold when tied. But it is a happy circumstance that the animal tissue (the peritoneum with some unstriped muscular fibre from the sheep's intestine) undergoes a remarkable physical change if suspended for some weeks in an emulsion of water and oil, in which, after growing soft and opaque during the first few days, it gradually experiences an alteration of an opposite character, and at length becomes again quite transparent, and is then little affected by water, and holds better when tied than waxed silk." Unprepared gut may be obtained from Mr. Gardner, 45, South Bridge, Edinburgh, for hospitals at 48s. a gross, which equals 144 hanks or skeins, each hank containing one

thread of about six yards in length, or about 4d. a hank. The *carbolised catgut* can also be purchased, ready prepared, from Mr. Gardner, the price varying with the size of the gut, and whether or not each hank is wound on a small reel or bobbin. The three smallest sizes, with bottle and oil, cost 6d. a hank each, and the large size, 9d.; but if they are wound on bobbins this increases the price to 9d. and 1s. In the case of hospitals some reduction is made from these charges. It will thus be seen that catgut ligatures are not expensive items in Lister's antiseptic system, and that the essential point in connection with them is to be sure that they have been properly prepared.

Catgut Holders.—With the view of rendering the ligatures portable, and yet at the same time having them surrounded with the carbolic mixture which can alone insure their efficacy, various contrivances have been suggested from time to time for carrying them about. One of the most convenient for placing in an ordinary pocket case was suggested by Mr. Lister himself, and was at first made of glass, but afterward of silver, and was adapted to one end of the caustic holder in the manner described by him as follows: "For every-day use, a small oil-tight capsule may be carried in the pocket case, and this can be replenished from a larger stock, as may be necessary. I have had a small silver bottle, with well-fitting screwed top, adapted to my caustic case, and this contains two little rods of wood, with gut of two sizes wound upon them, with a few drops of the antiseptic oil; and now that torsion has almost entirely superseded the ligature in ordinary wounds, this small supply will probably last me for months." A catgut holder in pocket case is supplied by Mr. Gardner, Edinburgh, for 6s. 6d. Also one for Hospital use at 10s.

Method of Application.—The steps of the procedure of applying a catgut ligature to the closure of cut or wounded arteries in open wounds, are really just the same as when any other kind of ligature is used. Lay hold of the orifice of the bleeding artery and pull it out from the surrounding tissues, either with a pair of ordinary artery forceps or with a tenaculum, so that the loop formed by the ligature may embrace the vessel and it alone. Then take a catgut ligature, measuring about two feet in length, encircle the artery forceps with it, and tie it loosely in a knot. Next, carry this knot over the point of the forceps by the tips of the two fore-fingers so as to embrace the mouth of the artery, and when it is quite down on the artery, tighten the knot so that all pressure is made at the bottom of the wound. In this way the risk of including the artery forceps in the knot will be

very much lessened. There should be no jerking or strong pulling when the knot is being tightened, for a very moderate amount of compression suffices, whereas violent tugging at the catgut may break it, or may displace it from the vessel, or may even cut through its tissues, which in some subjects are very friable. A second knot should then be tied, and in such a way as to make the two knots form what is termed a "reef-knot." Some deem it advisable to add a third knot, and there is no objection to such a course, though it is unnecessary. As soon as the knot is properly secured, *both ends of the ligature are cut off short close to the knot*, thus completely abandoning the former line of practice, where it was customary to cut off only one end of the ligature and leave the other hanging out of the wound, that of the main artery being distinguished by a knot tied on it. The reason for this course was that when the sloughing of the arterial coat had taken place the various ligatures could readily be withdrawn. (Dr. G. Beatson, p. 140.)

Catgut for Ligation of Arteries in their Continuity.—Dr. Bæchel, of Strasburg, reports eight cases of ligature of the arteries with catgut, and from a comparison of these with other numerous cases which were reported by English surgeons he deduces the two following conclusions: 1. That a catgut ligature properly applied obliterates in a permanent manner even large arteries. 2. That the reunion by first intention is easily obtained after these operations, provided that the rules of antiseptic surgery are strictly observed. In his own eight cases the incision of the ligature was closed in each at the end of three or four days. One of his cases left the hospital three days after the ligature of the brachial: another seventy-nine years of age got up ten days after ligature of the femoral. From the moment that immediate reunion becomes the rule, the field of surgery is wonderfully enlarged. We shall be able to approach the ligature of the subclavian artery within the scalenus, which until now has always caused death by secondary hemorrhage, as well as that of the primitive iliacus or hypogastric. As for the ligations which usually succeeded with the old methods after more or less prolonged suppurations, we can assert that the antiseptic dressing renders them so inoffensive that they are less exhausting to the patient than simple digital compression. There is no further reason why we should seek for a better agent of deligation than catgut. While it is reabsorbed after a certain number of days, it none the less leaves the artery obliterated, is a fact that has been verified too frequently to be any longer disputable. From what substance may we expect superior results? Undoubtedly silk threads or metal-

lic wires encyst themselves sometimes in the tissues without interfering with primary reunion. But they do not disappear, or if so, only after long months, and often cause suppuration which eliminates them even more slowly. The only admissible objection to the use of catgut is that we do not always have on hand threads of this material which are of good quality. The country doctor and the army surgeon will often be obliged to do without them. Then they may make use of a silk or linen thread boiled in carbolic acid: this thread is easier to prepare, to preserve, and to transport than catgut, and it is more like it, without, however, offering the same assurance for the success of the immediate reunion. But why surgeons who are converted to the antiseptic method still reject catgut for ligatures of arteries in continuity Dr. Bæchel is unable to explain, unless it be due to the instinctive fear caused by its reabsorption. Experience and reasoning have proved equally that this fear is chimerical, and it ought not to prevent us in future from making use of this valuable agent. (Dr. Eugene Bæchel, Practitioner, Nov., p. 372.)

Chronic Inflammatory Affections of the Joints in Childhood.—Although there are several methods by which rest may be more or less satisfactorily secured for diseased joints, the most convenient consists in the use of well-made leather splints. They must be long enough in the axis of the limb to give thoroughly efficient support. This is especially important for the knee and the elbow. For these joints the splints should extend as high as the upper fourth of the thigh or upper arm, and as low as nearly to the ankle or wrist. The elbow should be put up just within a right angle; the knee as nearly straight as it can easily be brought; the wrist slightly flexed, and the ankle very carefully at a right angle with the leg. Should the ankle be fixed with the heel at all raised towards equinus, the calf muscles are prone, by shortening themselves, to lead to troublesome contraction of the tendo Achillis. The parents are directed to take off the splints once a day, to readjust them, and see that the skin is sound; but with this exception they are worn constantly day and night. The leather of which the splints are made must be carefully selected. Their credit is often damaged by the use of the wrong material. Common sole leather contains a good deal of grease, and has been compressed in the process of manufacture. This kind remains stiff and clumsy, even after prolonged soaking. You must use leather from which all grease has been removed and which has not been compressed. Such leather, when soaked for five or ten minutes in water at a temperature of about 120°, to which a little

vinegar has been added, becomes perfectly flexible and limp, and will either stretch or close like wet flannel, so as to adapt itself to the uneven surfaces of a limb as accurately as a plaster-of-Paris mould. To make the splints take patterns of the two aspects of the limb in brown paper; cut out two pieces of leather according to these, but a little larger in all directions, and, when they are soaked, apply them closely and smoothly to the joint, letting them overlap at their borders; then fix them with a flannel bandage, and leave them for twelve hours to dry and harden upon the limb. Now trim them so that they just meet around the limb without overlapping; cut them away over the front of the patella and bevel their edges, and, with the help of thick paste, line them with chamois-leather; and furnish them with wide webbing straps fastening with buckles. (Mr. Howard Marsh, p. 118).

Compound Fracture.—*Compound Tincture of Benzoin.*—In a case of compound fracture of the right tibia, the leg was put up in an inside and outside splint, and bound up with three straps made of girthing web and buckles. The leg was then laid on its outside, and the wound simply covered with a few folds of lint steeped in compound tincture of benzoin. Next day the leg felt perfectly comfortable, and after the first five days I saw her only about every third day. There never was the least unfavourable symptom, nor was there a drop of pus. (Dr. F. M. Brown, p. 117).

Diseases and Injuries of the Spine and Pelvic Joints.—*Double Extension.*—Use double extension by applying equal weights to each limb, so as to balance the pull on each side of the spine. When the muscles of the spine, pelvis, and legs are thus placed *in equilibrio*, the patient is much more comfortable, remains more quietly in position, and can, if necessary, bear even more absolute weight with comfort. I begin (in a child under ten years) with a weight of two pounds to each foot, the weights being of lead made for the purpose, of the shape of steelyard weights, and provided with hooks above to fasten to the loop of bandage which is attached to the centre of the sole board. The weights are then gradually increased by a pound a week, until *the limit of easy endurance* by the patient is reached. At this point it remains during the treatment. I soon found that the forward lumbar curve became much more manageable and sooner obliterated; and I believe that the duration of treatment was thereby sensibly shortened, and the patient throve and fed better under the effects of increased comfort. Of course, in an older patient more weight will be borne easily; but I seldom exceed the

limits of twelve to fifteen pounds in hip cases. Although much greater weights than these are spoken of as common in surgical books, even as much as fifty pounds, or even double, in cases of fractured leg or thigh in the muscular adult male applied to one limb, I believe, from my experience of double extension in spinal, pelvic, and hip disease, that, used in this form, much less force is required, and especially in cases of coxalgia. It is not so much the amount of the actual pull which we require in such cases, as to ease off the pressure upon the diseased surfaces. This is, of course, limited by the resisting power of the ligaments of the joint, and may easily be made to do harm rather than good, by increasing the tension in the front part of the capsule of the joint, which MM. Martin and Collineau believe to be the main cause of the abduction of the limb met with in certain cases. What I look for in double extension are the steadying of muscular action and the prevention of spasm, combined with an equal downward and constant pull, tending to relieve the diseased joint-surfaces, and to remove muscular and atmospheric intra-articular pressure. The whole of these indications tend to the attainment of that physiological rest which is a powerful remedial agent in the treatment of joint-disease. By keeping the pelvis horizontal to the spine, the various tendencies of the limb to become abducted at one time and adducted at another are quietly, constantly and persistently, and soothingly checked and regulated by a counteracting influence ever present and always acting in the same direction and extent. The method allows perfect comfort and cleanliness to the patient, and all that requires watching is the effect of the strapping upon the heel and ankle. This point of extension may at each dressing be shifted upwards, and I have frequently employed it at the knee or calf, instead of the ankle and foot, either by adhesive plaister or soft broad leglets and straps. The treatment should be continued so long as the patient's health bears the confinement to bed, and then an apparatus to fix the joint in a straight position and which allows his moving about should be substituted. Of these, one of the best is Thomas's splint; but a cheaper, and, when carefully applied, an efficient, substitute may be found in a plaster-of-Paris or silicate of potash spica bandage, or a cast of leather or millboard, which, when stiffened and dried, may be cut so as to make a movable splint for the hip and thigh. (Prof. John Wood, p. 112.)

Lister's Antiseptic Dressings.—*Short Directions for.*—In some of the American hospitals the directions for carrying out Lister's treatment are thus conveniently and tersely stated:—(*a*) *Before and during operation.*—(1) Carbolic acid

spray. Steam passing through a solution of 1 part of carbolic acid in 30 parts of water. As it issues from the jet, the solution contains about 1 part of acid and 40 of water. (2) Sponges, hands of operators, &c., dipped in solution of carbolic acid (1 in 20). (3) Instruments covered with oil, containing one-tenth part carbolic acid; some are dipped into or kept in watery solution (1 in 20). (4) During intermission of spray the wound is covered with a cloth dipped in carbolic acid solution (1 in 20). (*b*) *After operation.*—(1) A strip of lint soaked in an oily solution of carbolic acid (1 in 10), or a pure rubber drainage tube, similarly treated, is left hanging from the wound during the first (and if necessary following) days. Either of them are cut off flush with the edge of the wound. (2) Over this is placed the protective, into which a small hole is cut, corresponding with the end of the drainage tube. The protective consists of a layer of oiled silk, coated on both sides with copal varnish, and afterwards brushed over with dextrin, which latter enables it to become uniformly moistened when dipped into solution of carbolic acid (1 in 40). It is thus immersed just before being laid upon the wound, and is intended to prevent irritation, which would be caused by the actual contact of the antiseptic dressing with the wound. (3) Two or three layers of gauze dipped in a watery solution of carbolic acid (1 in 40) are next applied. Then (4) seven layers of the antiseptic gauze, being a cotton fabric of open texture impregnated with a mixture of 5 parts resin, 7 parts paraffin, and 1 part carbolic acid. (5) Over this is applied the mackintosh, which is about 1 inch less in size than the gauze. (6.) Then another layer of antiseptic gauze is applied; and, finally, (7) carbolised bandages, sufficient to retain the dressings, &c. (Practitioner, May, p. 377.)

Splints.—*Air or Water Pads.*—The air or water-pads that I have had manufactured by the Britannia Rubber Company, 32, Cannon Street, have given me the greatest satisfaction. For padding a McIntyre's splint, these pads are invaluable; the leg lies on a small air or water-bed, and the patient never complains of pain or inconvenience; indeed, the limb will rest upon one of them for months without discomfort. Before applying a pad, I place it in a cover of linen, which is made waterproof by a simple chemical process known to everyone, and which I need not here detail. I then inflate it, and it is at once ready for use. If the limb be inflamed or irritable, I fill the pad with water instead of air. (Dr. E. C. Thompson, p. 133.)

Paraffin Splints.—It is desirable to get a substance which can be readily adapted to the limb. The material which answers

these purposes best is cotton wool. Any kind of cotton wool may do ; but the unbleached, unrefined cotton, made up in pound parcels, is much better than the white refined material. When about to make a splint, this unbleached cotton wool is taken and the single sheet unfolded. The thickness of this sheet is generally sufficient for most splints of the leg and the arm ; if the surgeon, however, desires to have it thicker, he can double the layer. A portion of this sheet, of sufficient size to envelop the limb, is cut with scissors,—not torn. It is not necessary to be careful about forming the cotton wool into any particular shape, provided it is sufficient to cover the limb and slightly overlap. The adaptability of the cotton is such that it fits the various curves of the limb. The portion so cut is rolled up into a form which will enable it to be placed into the vessel containing the liquid paraffin. It is then submerged in the paraffin for a couple of minutes. As demonstrating the amount of paraffin the cotton wool will take up and the rarefaction of the cotton wool itself, it may be said that the vessel containing the liquid paraffin may be almost full, and yet a large roll of cotton may be passed into this dish without causing the paraffin to overflow. After it is thoroughly saturated, the cotton is turned out of the vessel on to a portion of "mackintosh," which has had its surface previously oiled, in order to prevent the paraffin adhering. On this surface the sheet of cotton is unrolled. In lieu of the oiled macintosh a piece of paper, a tray, or the polished surface of a table, provided these are well oiled, may be used. After the paraffin has cooled to such an extent as to enable the surgeon to place the back of his hand on it without inconvenience, it is ready for application to the limb. This cooling process will occupy about three or four minutes, according to the thickness of the layer. During this time the surgeon may occupy himself in preparing the limb of the patient. This may be done by applying either a gauze or other roller bandage, so as to prevent the paraffin coming into direct contact with the limb ; or by placing one or two strips of tin next to the limb as a guide for the cutting off of the splint. When the splint is not to be removed from the limb till the end of the treatment of the case, such as in a simple fracture, the former method may be adopted ; but when the splint has to be cut off immediately after its application, such as one would prefer in a compound fracture, the latter method is the preferable. This sheet of cotton wool, saturated in the paraffin, is then applied to the limb, the surgeon seeing that the cotton overlaps ; he then applies a bandage, preferably of gauze, pressing the cotton firmly. This pressure causes a a greater cohesion in the splint, and also squeezes out any

superabundant paraffin. The limb is then plunged into cold water, or cold water is applied externally, when the splint will become solid in a few minutes. If, however, the splint is to be removed, instead of placing it in the cold water, it is cut up the side opposite the tin strip previously introduced. This may be done by first marking a line with a sharp knife, and subsequently cutting it up with dressing scissors. As soon as both sides of the splint are cut, before removal from the limb, it may be then plunged into the cold water; and after it has acquired a sufficient consistency to prevent alteration of shape, it may be removed from the limb and plunged into cold water to complete the consolidation. If it should be very inconvenient to cut the splint on both sides of the limb, the splint may be cut on one side only, and then separated so far as to enable the limb to be withdrawn, the surgeon seeing that the shape of the splint is retained, and after removal from the limb, the opposite side can be cut if desired. Windows can be made in the paraffin at any part wanted. The time occupied in applying such a splint, cutting it off, and consolidating it, would probably be about ten minutes. If the surgeon, instead of wishing to consolidate the paraffin, would like for any reason to retard the cooling, he, in that case, does not apply the cold water; the paraffin then remaining from about twenty minutes to half-an-hour in a plastic condition. (Dr. W. Macewen, p. 128).

Sprains.—The plan of treatment by direct, equal, and continuous pressure will be found exceedingly valuable; for, where it has been properly carried out, the joint returns quickly to its normal condition—pain being speedily relieved, and rigidity prevented. The treatment may be divided into two stages; the first lasting from a day to a week or longer, during which the treatment has to be directed to averting inflammation by rest, warm applications, anodyne lotions, etc.; the second commencing when the joint has become cold, swollen, and painful on movement—in fact, when the injury has assumed a more or less chronic character. It is during this second period that the active treatment ought to be employed. It is important not to commence this until the surface-heat is normal; for undoubtedly, when any tendency to inflammation exists in the tendon-sheath, pressure aggravates it, and I have known it to lead to untoward results. I will assume an ankle-joint has sustained a severe sprain all round, and has arrived at the chronic stage; modifications of the treatment of such a case will meet all that are likely to occur. To carry out the first principles of treatment by direct, *equal*, and continuous pressure, it is clear the fossæ mentioned above must be filled, or rather their sites covered

by pads so as to cause the retaining plasters, bandages, and splints to exercise equal pressure everywhere. By making pressure with the thumb from below upwards in the line of the fossæ, a good deal of the œdema may be squeezed away and the displaced tendons in some degree restored. I make, as a rule, five pads (of tow and lint or leather): two about four inches long by one inch wide (one a little shorter than the other, so as to be better adapted to the curve extending upwards from the dorsum of the foot to the crest of the tibia); another shorter, broader, and thinner, to place over the tibialis anticus and extensor proprius pollicis; and two, three or four inches long and bolster-shaped, to fill in the posterior fossæ on each side of the tendo Achillis. It is often advisable, in old-standing cases, to supplement the pads by strips of plaster to ensure firmer pressure. Both pads and strips of plaster should be made exactly to fit, as, if too large, they are useless, from the pressure being too diffused; and, if too small, they exercise too little pressure. A moment's consideration will render this obvious. If too large a pad, for instance, be placed over the outer post-malleolar fossa, its edges rest on the tendo Achillis and outer malleolus like the piers of an arch, leaving the fossa itself untouched. To keep these pads in their place, I use a long extended half-moon-shaped piece of plaster (emplastrum saponis spread on leather), long enough for the ends to overlap in front when the heel is placed in the centre, and a narrow oblong piece above this, placed round the lower part of the leg, to cover the upper part of the pads. The handiest way to apply the pads is to place an India-rubber band above the ankle, to slip the pads under it, and then, planting the heel in the centre of the curved plaster, to bring the two ends across the front of the joint so as to overlap. The pads having been secured in position, the elastic ring is to be cut, and the oblong piece of plaster put on so as to encircle their upper ends; lastly, the whole ankle is to be firmly bandaged. Amongst the working classes, or in the case of an uncontrollable patient, it is advisable to apply two thin splints over the anterior pads, keeping them in position by a long strip of adhesive plaster. Where there is much superficial ecchymosis, where there are bullæ, or where there is unhealthy-looking skin, instead of using soap-plaster, the pads may be kept in position and pressure maintained by a piece of lint on which ointment has been spread. Calamine ointment made stiffly is clean, and not uncomfortably greasy. If, as occasionally happens, even this should cause irritation, warm wet lint covered by oiled silk may be advantageously used over the pads, and secured by a firm bandage; but

neither of these applications can compare in efficiency with the soap-plaster spread on leather. (Mr. R. D. Fox, p. 134.)

AFFECTIONS OF THE SKIN, ETC.

Arsenic in Skin Diseases.—I find it good practice to begin with ten minims of liquor arsenicalis, and push boldly on up to fifteen or twenty minims; in this way, I have not only obtained results of a very satisfactory kind, but have seldom had much trouble from the patient's inability to continue the use of the drug. In fact, one girl, eighteen years of age, who was formerly a good deal upset by five minim doses, is now (on the occasion of a relapse of her psoriasis) taking fifteen to twenty minims, with most signal success. Against one dogma, held by Dr. Begbie and other excellent authorities, I feel it my duty to protest; and that is, the necessity for the production of the physiological effects of the remedy before it really begins to act efficiently as a curative agent. Dr. Begbie writes: "I have never seen the loathsome scales of lepra or psoriasis drop from the skin and leave healthy cuticle, till the eye and the tongue manifested that the system was under the influence of the mineral, and that for days and weeks together." In my own experience, I have not only found this to be quite unnecessary, but observation has taught me that, when the eyes begin to smart and the tongue to be covered with a silvery fur, the skin eruption usually becomes worse—not in the sense of that temporary irritation which may give the much needed stimulus to the sluggish progress of the disease, but as a needless, and therefore injurious, addition to the discomfort of the patient, being followed by no improvement, or giving better hope of permanent cure. As regards these physiological actions, which I hold we should avoid if possible, I should like to hear the experience of others regarding their frequency, and the order of their occurrence. Slight conjunctival inflammation is probably most usually observed, the patient complaining that his eyes are stiff and aching; and observation detecting fine infection of the superficial vessels, more especially of the lower lid, and, more rarely, a pink zone around the cornea. To this succeeds puffing about the lower lid, the loose cellular tissue between it and the malar bone, resembling the look of kidney-disease, and being occasionally, according to some observers, associated with albuminuria. The tongue is covered, save at the extreme tip, with a thin greyish fur, through which a few enlarged papillæ are distinctly visible, and the resemblance to an irritable patch of mucous membrane brushed over with a coating of mucilage

at once suggests itself. If the poisonous action of the drug be allowed to go further, we have a thick yellowish deposit, with bright red tip and edges, suggesting the irritation progressing below. I may say that I have always found the liquor arsenicalis to be a safe and reliable preparation. (Dr. R. Farquharson, p. 240.)

Corns.—Mr. Gezow, an apothecary of Russia, recommends the following in the Pharmaceutische Zeitung as a "sure" remedy for corns, stating that it proves effective within a short time, and without causing any pain; salicylic acid, 30 parts; extract of cannabis indica, 5 parts; collodion, 240 parts. To be applied by means of a camel-hair pencil. (Edinburgh Medical Journal, Sept., p. 279.)

Encysted Tumours in Conspicuous Positions.—*Removal of, without leaving any mark.*—This kind of tumour may, unless very firmly adherent, be easily removed by making a small incision into the cyst only just large enough to allow its contents to escape, completely emptying it by pressure, and then seizing its edges, which will be seen to project, and drawing it out. Even should a portion of the cyst be left, in all probability, the tumour will not reappear. When unable to get away any part of it, I have succeeded in effecting a cure by scarifying its interior, and so setting up adhesive inflammation. Three or four days after these operations not the slightest mark or trace of their having been performed can be detected. (Dr. Philip Foster, Med. Times and Gazette, Aug. 7, p. 149.)

Erysipelas.—*Local Treatment.*—I wish to bring under notice a method which I have seen produce excellent results. It consists in painting the surface over with tincture of the perchloride of iron, at the same time that the metal is administered internally. It invariably arrests the progress of the inflammation, and if applied early will abbreviate its course. Sustaining treatment is demanded in the usual way, and a careful application of the tincture twice a day for a few days must be observed. Under this routine I have witnessed the worst cases terminate favourably. I have no doubt but the inutility of most other preparations has been now fully recognised, and any serviceable remedy must be a desideratum. (Mr. P. J. Leniham, Lancet, May 8, p. 751.)

Erythema Multiforme, Erythematous Eczema, and Urticaria.—A valuable combination of sulphur is that known as "Startin's mixture:" ℞. Magnes. sulphatis, ℥i; ferri sulphat., ʒi; acid sulpur. dil., ʒij; tinct. gentianæ, ℥i; aquæ, ℥iij. M. Sig. one ounce after meals. This is very potent in reducing cutaneous congestion in such conditions as erythema multiforme, erythematous eczema, and urticaria. (Dr. Bulkeley, London Medical Record, July, p. 275.)

LEPROSY.—The conclusion at which I have myself arrived is, that fish is the one sole cause of leprosy. I do not mean to assert that the use of fish always causes leprosy, but that some poison generated in connection with fish causes the disease. How does this hypothesis agree with the chief facts relating to the natural history of leprosy. We find that nearly everywhere the disease is most common on the sea-shore, and that when it spreads inland it generally occurs on the shores of lakes, or along the course of large rivers; we find also that fish is largely eaten wherever leprosy prevails. I don't believe that any other article of diet has any influence whatever on the causation of the disease; this is so special in its character that it seems evident that it must have one special cause. I believe, however, that certain conditions greatly modify the action of this cause. We see that drаy-men drink an enormous quantity of wholesome beer before they suffer from gout, but others who obtain their beer under less favourable conditions get gout though they drink but little. And so with the fish: in some places we find that a large quantity is required to produce leprosy, in others a small quantity will suffice. Fish bred in warm waters seems to be more dangerous than that found in cold; fish in a state of decomposition is more dangerous than fresh fish, and fish in a special state of decomposition is very dangerous; the crustacea, although strictly speaking not fish, are also very dangerous. (Mr. Jonathan Hutchinson, p. 263.)

LUPUS.—Lupus never shows any power of spreading deeply. From beginning to end, it is a disease of skin or of mucous membrane, and only by accident are the deeper tissues ever involved. In this limitation to the structure, it differs definitively from the forms of new growth which we class as "malignant." As far as the cure of the local process is concerned, it must be effected by local measures, and these measures must be of the nature of destructions. The new cell-growth must be destroyed, eradicated without delay and without flinching. Without doubt, the most important point for discussion is as to the best means of destroying the vitality of the lupus growth. I have had considerable experience of these methods—the use of caustics, the actual cautery, and Volkmann's erasion method. All are very good, but I unhesitatingly prefer the last. If caustics are used, they must be used very freely. I have repeatedly seen a patch wholly cured by a single dressing with chloride of zinc or acid nitrate of mercury. As a rule, these remedies were used too timidly, or without sufficient painstaking. They give more pain than the actual cautery, but their sores granulate better and heal more quickly. The actual cautery is comparatively painless,

can be easily limited, and at the same time made to act deeply. It is very efficient, but its burns are sometimes slow to heal. The erasion treatment appears to give less pain, to be very efficient, and to leave a sore which heals rapidly and soundly. Its introduction will, I think, mark a new era in the treatment not only of lupus, but of rodent ulcer. It is so simple, so easy of employment, and has in it so little that is alarming either to surgeon or to patient, that it is likely in the future to be employed in the early stages, whilst there is good hope of the complete cure of the disease. Lupus erythematosus is often benefited by solutions of tar and of lead, and the free internal administration of arsenic. (Mr. Jonathan Hutchinson, p. 253.)

Carbolic Acid.—In a case of lupus of the nose of two and a half years' standing, which had caused partial destruction of tissue, there were also patches of lupoid ulceration on septum and floor of nasal cavity, gum of upper jaw on right side, and left tonsil. I put the patient on cod-liver oil, syrup of the iodide of iron, and painted the ulcerated parts with pure carbolic acid twice a week. After a few applications the diseased parts of nose began to look better, but the gum and tonsil were very obstinate. However, at the end of two months they yielded to the treatment, and she was discharged cured. In a second case the disease was the form known as lupus erythematodes, and caused little or no loss of tissue, although of three years' duration. I gave four minim doses of liq. arsenicalis three times a day, and had the nose poulticed until scabs came off, leaving an ulcerated surface behind, which I painted three times a week with pure carbolic acid, and the red non-ulcerated portion twice a week. After a short time the ulcers began to heal and the red non-ulcerating surface to assume a pale and healthy appearance. She was discharged cured. (Dr. J. C. Hall, p. 262.)

Iodide of Starch.—For the introduction of the iodide of starch as a remedial agent we are indebted to Dr. Andrew Buchanan. Owing to the irritant local action of other preparations of iodine, he was led to look out for some new medicinal preparation which might be less acrimonious in its local action, whilst its absorbability and alterant virtues were not diminished, and for this purpose the iodide of starch suggested itself to him; and there can be no doubt that by employing it much larger quantities of iodine can be introduced into the system, even to the extent of over seventy grains daily. The following is the formula for its preparation: ℞ Iodi gr. xxiv; amyli ʒj. Triturate the iodine with a little water, gradually adding the starch and continuing the trituration till

the compound assumes an uniform blue colour, so deep as to approach to black. The iodide should be dried with a heat so gentle as to run no risk of driving off the iodine, and it ought be kept in a well-stoppered bottle. On no account should spirit be used in its preparation instead of water, as sometimes recommended. The dose is a heaped-up teaspoonful in a draught of water or water-gruel thrice daily; but it may be safely increased, even up to an ounce in some cases, if necessary to make an impression on the disease. I have generally found, however, if it will do good in lupus erythematodes, that the first-named dose is sufficient. Those who are inclined to give it a trial, should take care of two things: first, that the cases they are dealing with are really undoubted ones of lupus erythematodes and not lupus vulgaris; and second, that the medicine is freshly prepared and in accordance with the directions above mentioned. (Dr. McCall Anderson, p. 258.)

Linear Scarification.—Scarification, in the form of so-called "multiple *punctiform* scarification," has been employed for many years in the treatment of lupus, and with considerable success in many countries. Under any other method of treating lupus with which I am acquainted, the nose, in the condition in which it commonly comes under observation, is in great part necessarily lost, even when treatment happily achieves the complete cure of the disease; but, when the treatment is by linear scarification, the nose may often be actually *rebuilt;* so that the organ, already in part virtually destroyed, may at length be regained in its original form. In other words, the lupus-tissue, which has come to replace the substance of the true skin, instead of undergoing actual destruction—as, for example, it does under treatment by cauterisation—or, again, instead of undergoing molecular ulceration by the application of semicaustics, such as the red iodide of mercury, advocated by Dr. Hardy of Paris, becomes actually the material out of which repairs are constructed. The operation is painless, if the skin be first frozen by the ether-spray. It may be rendered expeditious by a multiple linear scarifier which has been constructed for me by Messrs. Weiss, of London. It is in every way less irksome to the patient than any other means of local treatment; that is to say, than any other means (of efficacy) of which I am aware. I do not speak of internal remedies, since I have found them to fail. It remains to compare the effect of linear with that of punctiform scarification. The latter consists of stabbing the affected skin with a fine needle, or with the point of a narrow lancet. This method fails in precision. It is impossible to space the punctures equidistantly; and, in practice,

the skin presents always, after the operation, clusters of punctures more or less crowded on one another, with intervals of but scarcely punctured skin; whereas in linear scarification, especially if it be performed with a suitably adjusted multiple scarifier, the incisions are *equally* spaced, so that even at the first operation the effect produced is uniform; whereas by repetition of the operation, veering the direction of the incisions at each repetition, the complete disappearance of the disease may be speedily arrived at. I have only to add that the little cuts heal completely within a week, so as to permit a repetition of the operation: and that eventually the cuts leave no perceptible trace of their existence. In fact, they disappear *absolutely* after a moderate interval. A satisfactory amelioration of the disease results within a few days after the first performance of the operation, which needs to be repeated, as to some cases, only a very few times in order to ensure a complete and often a lasting cure. (Dr. Balmanno Squire, p. 260.)

NÆVUS.—*Sodium Ethylate.*—In the case of a child aged 13 months, with nævus over the right parotid gland, on Nov. 12th. Sodium ethylate (of one-half saturation) was painted over it, and the application repeated three times in the next fortnight, and five times more at intervals of a month or two, till on Aug. 3, 1879, the nævus was practically cured, the only marks perceptible being from the surgical interference (the entrance and exit points of the needles); had the ethylate been used from the first there would have been none, and its application is attended by little or no pain. To Dr. Richardson we are indebted for a most valuable addition to our armamentarium. (Dr. B. Walker, p. 239.)

RINGWORM.—*Linimentum Crotonis and Salicylic Acid.*—After making trial of various agents, I have obtained the best results by painting the most obstinately affected portions of the scalp with linimentum crotonis and directing the subsequent frequent use of an ointment or lotion of salicylic acid. One application of the croton oil usually suffices to produce a copious pustular rash over the parts with which it is brought in contact. If it fail to do so, the application should be repeated. An ointment of ten to forty grains of salicylic acid to the ounce of the base selected should then be rubbed over the scalp twice or thrice daily. The strength, frequency, and vigour of the application should be proportioned to the inflammatory effect that results. All crusts, scales, and diseased hairs, should be removed as speedily as possible. Though this mode of treatment is neither suitable to every case, nor universally successful, it possesses some

advantages. 1. The croton oil liniment gives rise to no pain at the time of its application, while the consequent suppuration is not in most cases more irksome to the patient than the prolonged and acute pain that attends the use of the usual caustics. 2. Permanent loss of hair does not result. 3. The treatment is easy to carry out. 4. Many intractable cases rapidly mend when so dealt with. 5. The agents employed are not poisonous. I usually prescribe salicylic acid as an ointment of from ten to forty grains of the acid to an ounce of lard, vaseline, &c., and I often find advantage from combining it with other drugs, as carbolic acid or oil of cade, &c. If it be desired to increase its irritating properties, the addition of a few grains of perbromide of mercury or antimony chloride to the ointment will be effectual. Again, if an eczematous state of skin have supervened, some of the more soothing of the salts of zinc or mercury may be advantageously ordered with the salicylic acid. If a liquid form is preferred, from twenty to forty grains of salicylic acid may be dissolved in an ounce of alcohol and the affected parts painted with the solution two or three times a day. Such solutions often set up much skin irritation. (Dr. Wyndham Cottle, p. 245.)

Scabies.—Almost every specialist seems to have his own favourite ointment or lotion. Sir Robert Christison is in the habit of using a lotion of chloride of lime, one to forty or sixty parts, and applied five or six times a day, or continuously with wet cloths. The case is generally cured in eight days. Hardy uses a sulpho-alkaline ointment composed of carbonate of potass, sulphur, and lard. Dr. M'Call Anderson prefers using styrax ointment, which he says "is clean looking, has a pleasant aroma, and soothes rather than irritates the skin." Erasmus Wilson uses the old sulphur ointment, and I think it is the remedy most extensively used by the profession generally. I am in the habit of directing my patient to have first a warm bath in the evening, using soap and water freely; then, after being dried, to have the sulphur ointment well rubbed into the skin all over the body, but paying particular attention to the clefts of the fingers, wrists and forearms—in fact, where the eruption is generally found,—the head and face, of course, are excepted; then to go to bed in this state, and in the morning have a second bath to wash it all off and clean the skin. In many cases this is sufficient, but, if necessary, it may be repeated a second or third time after an interval of one or two nights. I have never seen this treatment fail, and therefore very seldom use any other. The chief objection is its rendering the exhalation from the body very offensive. If used legitimately, however, as I have described, this hap-

pens only in a very slight degree, being chiefly the result of excessive use of the remedy. A preparation of sulphur and lime is used very much in hospitals and schools, and it has the advantage that a single application is sufficient. But from what I have seen myself it has some serious disadvantages. It is very irritating, and always leaves the skin in a very rough, scaly condition, almost like pityriasis; and in severe cases of scabies, where the hands are pustular, although curing, it generally causes an inflamed condition of the skin often more difficult to cure than the original disease. In private practice, therefore, I never think of using it, and even in public institutions I would not be inclined to make it the regular remedy. The late Prof. Bennett used to recommend the use of simple lard, simply smearing the body all over with it so as to smother the insects. In very young children I generally do this, but after the age of four or five years prefer using a specific. (Dr. W. Sang, p. 249.)

Small Pox.—*Prevention of Pitting.*—Dr. Schwimmer describes his method of applying Lister's carbolic acid paste in small-pox with a view of preventing pitting. The paste (acid carbolici, 4·0-10·0; olei olivæ, 40·0; cretæ trit. alb., 60·0) is applied to the face upon a linen mask, with openings for the nose, mouth, and eyes—strips of linen suffice for the arms and hands. These applications are left undisturbed for twelve hours, when fresh ones can be substituted. Suppuration is greatly shortened, and the intensity diminished. Whilst in parts without treatment the stage of desiccation appeared between the thirteenth and fifteenth day; on the face it set in on the ninth and eleventh day. There was no excessive suppuration on the face. Upon the commencement of desiccation the mask was usually removed. Ten to fourteen days after complete desiccation the skin of the face was free from all traces of the disease, or at the most, spots of pigment were visible that gradually disappeared. (Dr. Schwimmer, Practitioner, Nov. p. 369.)

Dr. Alonzo Clark, of New York, states that the use of collodion blackened with animal-black is quite as good a method as any. The animal black gives a very fine powder, and, mixed with the collodion while the collodion is soft and then applied with a brush all over the face, it adheres very well. And this, it is believed, will act in a way to cause abortion of the pustules upon the part to which it is applied. It will not do to apply it to any considerable part of the body, but the face is most important, and it is applied only to this part. (Dr. Clark, Dublin Journal of Med. Science, Sept.)

Sweating of the Feet.—*Boracic Acid Solution.*—In a case of this kind, the reaction of the moisture in the stocking and in

the sole of the boot was alkaline, that of the moisture exuding from the skin of the sole of the heel faintly alkaline, whilst that of the perspiration of other parts of the body was acid. The fluid from the sole of the heel was thus shown to be not pure sweat, the faintly alkaline reaction being doubtless due to the serous discharge accompanying the eczema set up by the local hyperidrosis. The fluid in the sole of the stocking was found to be teeming with bacteria forms, the nature and development of which I have carefully investigated. These investigations have produced results of some scientific interest, which I have communicated to the Royal Society. The rapid development of bacteria in the fluid which exudes from the soles is doubtless favoured by the alkaline reaction produced by the mixture of serous exudation with the sweat. The treatment instituted in this case is as simple as it has been effective. The stockings are changed twice daily, and the stocking-feet are placed for some hours in a jar containing a saturated solution of boracic acid. They are then dried, and are fit for wear again if it be desired. The boracic acid effectually destroys the smell. But to kill the bacteria in the stocking is not enough. The leather in the bottom of the boot is wet and sodden, and smells as vilely as the stocking. This difficulty is got over by the use of cork soles. I directed my patient to get half-dozen, which she finds sufficient. A pair must only be worn one day unchanged; at night, they are placed in the boracic jar, and are put aside the next day to dry. If these directions be accurately carried out, the evil smell is perfectly destroyed. The boracic acid solution is an excellent application to the painful skin in these cases. When the tender skin of the soles is washed with it, a sensation of coolness succeeds the feeling of heat and tension which are the usual accompaniments of the eczematous condition associated with the smell, and the skin becomes harder and loses its abnormal redness. (Dr. George Thin, British Medical Journal, Sept. 18, p. 463.)

VENEREAL AFFECTIONS.

GONORRHŒA.—*Hydrate of Chloral Injections.*—The slightly caustic and astringent taste of chloral suggested to Dr. Pasqua the idea that this remedy might prove useful in gonorrhœal discharges. He accordingly tried it in four cases, with very fair results. He directed that a quantity of a solution containing a gramme and a half of chloral to 120 grammes of rose water, should be injected twice a day; this caused slight smarting at first, which was soon followed by an agreeable sensation of coolness in the urethra. In three days urina-

tion was no longer painful, erection was less frequent, and the discharge clearer; in eight to ten days the cure was complete. In none of these four cases was there any complication observed; there was no indication of orchitis, stricture, or any of the other accidents which are apt to characterise the course of a badly treated gonorrhœa. (Dr. Pasqua, Glasgow Medical Journal, June, p. 505.)

Gonorrhœal Ophthalmia.—In a case of this kind Mr. Bader says: I considered the eye nearly lost, and felt justified, instead of the usual treatment, to try the effect of an ointment made of daturin and nitric oxide of mercury, of each one-fifth of a grain, vaseline one ounce. I thoroughly washed away the discharge with tepid water, then with a large camel's hair brush freely, though with difficulty, pushed the ointment beneath the upper eyelid of the right eye; this caused no pain whatever. Both eyes were then bound up with lint thickly smeared over with the ointment. The attendant was informed of the dangerous nature of the discharge, and was told to wash it away every third hour, and to apply fresh lint spread over with ointment to the eyelids of the inflamed eye. For four succeeding days I applied the ointment myself beneath the right upper eyelid. On the third day the patient became slightly delirious, probably from the effect of the daturin. The mercury was increased to one grain, the daturin remaining one-fifth of a grain. Feb. 1. Much better: ointment applied beneath the upper eyelid as before; fresh lint used once daily only; pus washed away repeatedly during the day: cornea visible throughout lower third, still opaque, but not ulcerating. 3rd. Eyelids again swollen with much pus. From this day rapid progress was made. As soon as the eyelids opened freely, the application of the ointment with the brush was discontinued, and only lint and ointment applied every morning to both eyes. The left eye kept free from inflammation throughout. March 5. Both corneæ clear; eyelids open freely. (Mr. C. Bader, p. 230.)

When one eye only is affected the sound eye is at once protected by the application of Buller's shield, kept in position by strips of strong adhesive plaster. Iced compress or iced alum lotion is kept constantly applied over the lids of the inflamed eye, and a solution of chloride of zinc (2 grs. to the ounce) dropped into the eye from three to six times in the twenty-four hours, the frequency varying according to the amount of the discharge. The everted lids are painted once daily with a solution of nitrate of silver (20 grs. to the ounce) and the patient is instructed to bathe the eye fre-

quently with cold alum lotion. Should there be decided localised corneal haze, with or without ulceration, or should such a condition appear after admission (as it sometimes will notwithstanding all precautions), cold poppy lotion is used instead of the iced compress, and drops of a solution of sulphate of eserine (2 grs. to the ounce) are dropped into the eye six times daily. The chloride of zinc drops are often discontinued or a weaker solution is employed, but even in cases of deep ulceration this solution does not cause the irritation that might be expected. The brushing of the lids is continued, great care being employed in their eversion, so as to avoid rupturing the affected corneal tissue. When the discharge has nearly ceased the lids are only brushed once every second or third day, and this treatment is gradually discontinued. The good effects of eserine on the true, deep gonorrhœal ulcer are very decided, and even where there is a large sloughing of cornea these drops may be used with great advantage. (Dr. Marcus Gunn, Royal London Ophthalmic Hospital Reports, Aug., p. 80.)

AFFECTIONS OF THE EYE AND EAR.

CATARACT.—*Operation for, by Discission from Behind.*—In the operation of discission, as hitherto performed, the capsule and cataractous lens are attacked from the front, the cataract needles being introduced either by puncturing the cornea and thence pushed on through the pupil against the front of the cataract, or by puncturing the sclerotica and then directing the point of the instrument forwards through the extreme circumference of the cataract into the posterior chamber, whereupon by moving the handle of the instrument from behind forwards, its point is directed backwards against the front of the cataract. In the operation of discission from the front, whether by corneal or by sclerotic puncturation, the lenticular substance by imbibing aqueous humour is liable to swell up, and pressing forwards against the iris often excites inflammation of that structure. But supposing this danger got over, it is not uncommon to find, after the opaque lenticular substance has disappeared by absorption, opacity of the posterior wall of the capsule, constituting what is called "secondary capsular cataract." Opaque capsule or secondary capsular cataract, remember, is never absorbed, and, being tough, does not always admit of being torn up or even extracted. One great advantage of lacerating the posterior wall of the capsule from behind, in the first step of my operation, is that the posterior wall of the capsule being

thus removed from opposite the pupil, no opacity of it in that place can of course supervene to form the secondary capsular cataract I am speaking of, and which so often mars the ordinary operation of lacerating the anterior wall of the capsule, and breaking up the cataract from the front. Another advantage of lacerating the posterior wall of the capsule and breaking up the cataractous lenticular substance from behind is that the iris is saved from any irritation of pressure by the swollen lens, and therefore inflammation of it is less likely to occur. Swelling of the lenticular substance by imbibition of fluid from the vitreous body after laceration of the posterior wall of the capsule does indeed take place, but it presses back into the soft centre of the vitreous body, and causes no irritation. (Prof. Wharton Jones, p. 209.)

Cataract Operations.—In a report on a series of cataract operations by Dr. Story, the method of operating in all cases, where the reverse is not distinctly stated, was as follows:—Anæsthetics were never given; the patient lay on a couch facing the window, and the surgeon, standing or sitting behind the patient's head held the knife (Von Graefe's knife), right-handed for the right eye, and left-handed for the left eye. The difficulty of using Von Graefe's knife with the left hand seems to have been greatly overrated by some surgeons. A stop speculum was always used; the plan of holding the lids open by means of assistant's fingers, which has been adopted in some foreign cliniques, does not seem to have anything to recommend it—not even novelty. The assistant's fingers were used instead to restrain the action of the extra palpebral portion of the orbicularis. The globe being fixed by a toothed forceps, the incision was made upwards. An iridectomy was never omitted. Until an operator has satisfied himself that his results with iridectomy are as good as it is possible to produce by that method, it is wiser not to experiment in operating without iridectomy. In performing the iridectomy the fixation forceps, when necessary, was given over to the assistant to hold, this plan being manifestly better than allowing the assistant to use the scissors, as is sometimes done, and often recommended. Wecker's or Dowell's scissors were used in nearly all the cases to cut the iris. The capsule was opened by Weber's method, when not otherwise stated, and the speculum was removed either immediately before or immediately after the cystotomy. It was never kept in during the delivery of the lens. Before dividing the capsule all clots and blood were removed from the anterior chamber, and the edges of the iris reposed. The nucleus was delivered by pressure of a large curved curette on the cornea, through the under-lid. In no case was the

cornea itself touched by a curette. If this manœuvre failed, Bowman's spoon or Taylor's vectis was used to extract the cataract. The *débris* was removed by gentle rubbing with the lower lid, unless where it is stated that a curette or spoon was inserted for the purpose. The pupil being cleared, and the wound edges cleaned, the eye was closed, a piece of fine cambric and cotton wool carefully applied over the lids, and firmly tied down by Liebreich's bandage. In some of the later cases simple absorbent cotton wool was used directly over the lids, without the interposition of any cambric. It is to be understood that neither atropine nor eserine nor any other medicaments were used, unless the fact of their use is mentioned. As a rule the bandage was not changed for twenty-four hours, and the eye rarely examined or opened for forty-eight hours after the operation. (Dr. John B. Story, Surgeon to St. Mark's Ophthalmic Hospital, Dublin, Dublin Journal of Medical Science, Aug., p. 97.)

Corneal Ulcers.—The treatment of ulceration of the cornea varies necessarily according to the character of the ulcer. Where it is deep, with an irregular, undermined periphery and surrounding infiltration, with or without hypopyon, nothing gives such good results as the use of eserine drops five or six times daily. The eye is at the same time bathed for some minutes every half hour with hot poppy fomentation, and quinine is administered internally thrice daily. Stimulation with strong solution of nitrate of silver (applied to the part with a fine camel hair brush) is used in the indolent clear ulcer. Phlyctenular ulcers when they do not tend to perforate, and when they are not accompanied by much photophobia, are treated by insufflation of calomel, or the application of dilute yellow oxide of mercury ointment (Pagenstecher) once daily. (Dr. M. Gunn, Ophthalmic Hospital Reports, Aug., p. 81.)

Eye Diseases.—*Boracic Acid.*—Boracic acid is especially efficacious in the treatment of purulent conjunctivitis, including gonorrhœal ophthalmia and ophthalmia neonatorum, catarrhal conjunctivitis, asthenopia from whatever cause arising, and the conjunctival hyperæmia which usually accompanies it. In phlyctenular ophthalmia, atropia and yellow oxide of mercury leave, in the majority of cases, little else to be desired, but when the inflammation is chiefly conjunctival and somewhat catarrhal in type, these remedies do not always act so well, and in this condition boracic acid will be of service. In relieving atropinism, and when used with the atropia in preventing it, it is undoubtedly of the greatest use. In inflammatory affections of the cornea, so far as it has yet been tried,

the results are decidedly favourable, and its use may be recommended in pannus, ulcerative and suppurative keratitis, and in the various forms of diffuse corneal inflammation. As an adjunct to the probe in the treatment of lachrymal affections it promises to be of much value. In marginal blepharitis, an ointment containing ten grains of the acid to a drachm of simple cerate has been found of unmistakable service in some cases. Finally, with boracic acid substituted for carbolic acid, the principles of antiseptic surgery may be applied to the graver operations upon the eye. In asthenopia, in catarrhal conjunctivitis, and in keratitis, a solution containing two to four grains of boracic acid to an ounce of distilled water may be used, preference being in most cases given to the latter strength. Three to four applications in the course of the day will, as a rule, be sufficient, but if necessary, it may be applied more frequently with safety. In the different forms of purulent conjunctivitis, and more especially in gonorrhœal ophthalmia, stronger solutions will most probably be required; and since even a saturated solution, gr. xx. to ʒj. causes only a most trifling and momentary irritation, it will be better, when the case can be kept under observation, not to trust to a solution of less strength. Boracic acid exercises in regard to the eye astringent and antiseptic properties, and in addition a topical influence which may properly be termed sedative or anodyne. (Dr. Theobald, in New York Medical Record, Practitioner, July, p. 56.)

Mydriatic Properties of Homatropin or Oxytoluyltropein.—The discoveries of late years have added largely to the number of pupil-dilators, and some of these may, perchance, be more or less free from these ill-effects of atropin. Daturin, duboisin, ethyl-atropium, gelsemin, hemanthin, hyoscyamin, muscarin, narcissin, and pituria have all been found to be more or less powerful dilators of the pupil when locally applied, and impairers of accommodation. To this growing list we have now to add homatropin, which promises to be of very great value and utility in ophthalmic practice. It is a bland but efficient mydriatic, rapid in its action, and of comparatively short duration. It has, besides, many of the better characteristics of atropin. (Mr. John Tweedy, Lancet, May 22, p. 795.)

Nictitation.—*Belladonna.*—I was induced to try belladonna in this disorder from its well-known paralysing action upon the third nerve, and its administration was speedily followed by relief. These spasms and twitchings are associated by some with disorders of the digestive apparatus, but I have generally found them follow prolonged nervous exhaustion. There is

no drug so speedily powerful in restoring strength and apparently nerve power. It is best administered in combination with hyoscyamus, and, in preference, I use the succus belladonnæ, fifteen minims, with succus hyoscyami, twenty minims, three times a day. If this should fail, large doses of cannabis indica might be of advantage. (Dr. T. F. Pearse, Lancet, April 24, p. 665.)

Purulent Ophthalmia of Infants.—Argent. nitrat. is a valuable remedy, but a two-edged sword. I am so strongly impressed with the havoc which it does to infants' eyes, that I very rarely used the solution in my clinique, for fear lest some of you should carry a vague notion of its application, and be the means of doing mischief. The course which we adopt is:—1. When I happen to see the case in the first stage, before the purulent discharge has set in, I make the patient's head recline upon my lap upon a towel, where it is secured. I evert the lids, either both together, or first the upper and then the lower, and after cleaning them with dry lint, I touch the conjunctival surface with lint dipped in a solution of ℞. Boracis grs. x, aq. rosæ ʒj, aquæ ad ʒvj; one dessert-spoonful in ʒij of warm water. I then put a few drops of the solution of atropine upon the conjunctival surface. ℞. Atropiæ sulph. gr. j, aquæ ʒ ij, glycerini ʒ ss; a few drops. The application is repeated three times a day. The atropine has an antiphlogistic effect upon the inflamed surface, and also by dilating the pupil relieves the tension of the eyeball. I never use cold applications, which are recommended by eminent authorities, neither do I employ ointments of any kind to keep the lashes from sticking together. This I think is best effected by washing with warm water. Dry lint is then applied to the lids, and secured by an immovable bandage. I watch the case carefully. 2. When I see that it is an unmistakable case of purulent ophthalmia, I proceed to the following course:—The patient's head being put upon my lap, I evert the upper eyelid, then the lower, and having cleaned away the pus by means of dry lint, I drop in a little of the solution of atropine, then I touch the surfaces with an amalgam consisting of argent. nit. two parts, and potass. nit. one part, and again put a few drops of atropine upon the cauterised surface. When the conjunctival surface is bleeding (which I regard rather as a favourable symptom), I dry it with lint, and repeat the cauterisation. I touch the whole of the conjunctiva and also the *cul-de-sac*. I bathe it with lint dipped in warm water, and cover the eyes with dry lint and a bandage. When one eye is affected, I close the healthy eye with two strips of court plaster, and cover it with lint. (Dr. J. R. Wolfe, p. 225.)

Relaxation of the Membrana Tympani.—To restore lost tension is the rational treatment of relaxed membrane. Contractile collodion applied on the membrane of the tympanum adheres firmly, contracts the membrane to a greater or less extent, whilst it remains adherent, and also exerts a permanently beneficial influence on the relaxation. (Dr. W. A. M'Keown, p. 233.)

MIDWIFERY, ETC.

Displacement and Descent of the Uterus.—Displacement without descent is, so far at least, an uncomplicated affection. Descent in addition to displacement introduced no new kind of disease, but a changed set of conditions not so simple as those of displacement without descent. I regard the morbid importance of displacement as being much exaggerated. It would be nearer the truth to say it had little or no importance. Then, the wide range of symptoms attributed to displacement I consider quite unjustified by clinical facts. The treatment of displacement without descent, whether it was desirable or not, was an utter failure; and displacement was never cured, in the sense that the uterus afterwards remained in place without a pessary. (Dr. J. Matthews Duncan, Obstetrical Journal, Aug. 15, p. 489.)

The mere backward or forward displacement is of no consequence. The symptoms which lead to the seeking of our aid are due to the descent and dragging on the ovaries and broad ligaments, with consequent interference with the functions of bladder or bowel. Extreme retro- or ante-flexion without descent may, from mechanical obstruction to the cervical canal, cause trouble, but this is easily remedied by the occasional use of graduated sounds. With regard to stem pessaries, I do not believe they ever really cure, and I believe they often do incalculable mischief. Those who put them in do not often see their ill-effects, for the patients, finding themselves worse instead of better, seek other advice. I believe those who take out pessaries, as a rule, do infinitely more good and infinitely less harm than those who put them in. (Dr. Knowsley Thornton, Obstetrical Journal, p. 490.)

Labour.—*Hydrobromic Ether as an Anæsthetic in.*—In some instances in labour both ether and chloroform will produce, in certain females, so much relaxation that, if there is the slightest tendency to hemorrhage, it will be very much increased. To test the influence of hydrobromic ether, Dr. Turnbull, of Philadelphia, administered it Feb. 24, 1880, to a

patient aged thirty, a lady with a narrow pelvic outlet and very rigid os uteri, who had been in labour with her fourth child for nine hours, having made but little progress. The hydrobromic ether was used in tablespoonful quantities, when the pains were most intense and distressing, and gave as prompt relief as ether, and yet it did not interfere in the least with the expulsive efforts. Her pulse was only increased six beats; no apparent disturbance of her respiration, only a feeling of fulness in the chest. The baby (a female) was born full of life and vigour, and cried lustily. There was a slight laceration of the perineum, as the occiput was pressed strongly upon the tissues. The patient had not a bad symptom from the use of this form of anæsthetic, and there was no sickness of the stomach. The whole quantity employed was five tablespoonfuls. There was no hemorrhage, and the placenta was expelled with but slight traction. This, he believes, is the first time of this agent having been employed for this purpose. (Dr. Turnbull, Dublin Journal of Medical Science, Aug., p. 187.)

Menorrhagia.—*Ergot and Sulphuric Acid.*—Of all the medicines with which I am familiar—and I have tried a great number—ergot stands first. In obstetrics you are generally told that ergot produces its effect in about fifteen minutes: that is doubtful even in parturition; but in the unimpregnated woman you must not expect it to act thoroughly till days of its use have elapsed, and in some cases I have observed its use has had no result until it has been continued for weeks without intermission. After ergot, in popular estimation, come gallic and tannic acids. I am not quite sure that they have any effect at all. They may have an effect, and be as rationally used as other medicines. I have used them extensively, and the impression they have left on my mind I have just told you. The medicine which seems to me next best after ergot of rye is sulphuric acid, often combined with some saline; and no injury is done if the saline produce slight relaxation of the bowels. You have not long to wait for sulphuric acid to produce its effect. You may have to give it in large doses, and frequently; for instance, you may give one drachm, or even twice as much, in a day, dividing it into frequent doses. The beneficial influence of digitalis and cannabis indica is almost certain, yet in point of reliability these remedies come considerably after ergot and sulphuric acid. (Dr. J. Matthews Duncan, p. 292.)

New Forceps.—Since Tarnier introduced his forceps, there have been various attempts on the part of British accouch-

eurs to adopt his principle of axis-traction in a simple manner. Prof. A. R. Simpson has modified the well-known Sampson's forceps as follows. To each blade is affixed a curved rod. The rod on the left blade has a traction handle joined to it. Thus, the right blade has only a traction rod, which locks with the traction handle by a simple slot. The old handles are made smoother and lighter. There are only two pieces in the forceps. When the forceps is applied and traction made, it can be seen by the dotted line (*vide* woodcut, p. 308) that this is in the exact proper axis. The blades are introduced just as those of the old Sampson forceps are, viz.: the left blade first and to the left side; the right blade is then passed to the right side—the only point being that, while it is being passed, the traction rod should be swung to the front. When the blades are locked, it is then swung back and fixed by the slot. This forceps has been used on several occasions with great success. Mr. Gardner, 45, South Bridge, Edinburgh, is the maker. (Prof. A. R. Simpson, p. 308.)

OVARIOTOMY.—*Complete Intra-peritoneal Ligature of the Pedicle.*—In 1821, Nathan Smith, in America, adopted an exceedingly good plan, and one which came very near to perfection. He ligatured the vessels separately, and cut the ligatures short; and he used an animal tissue for these ligatures, viz., leather. Of course leather is not a very suitable material for ligatures, because, when wet, it is both slippery and unduly yielding. Dr. Tyler Smith, in performing his eighth ovariotomy in 1861, reintroduced the method of Nathan Smith, transfixing the pedicle, cutting the ligatures short, and dropping the stump back into the peritoneum. To him undoubtedly belongs the credit of popularising this method with the profession, though he cannot deprive our American brethren of the honour of first introducing it. Having seen Mr. Wells employ this method in a large number of cases in which it was impossible to employ the clamp, I became convinced that it was *the method* of the future, and only needed to be applied constantly in a long series of cases to establish its superiority over other methods. 1. It is universally applicable. 2. It is, when used with sufficient care, a perfect safeguard against hemorrhage. 3. It is scientific in principle. 4. It is neat, cleanly, and speedy in application. 5. It allows the incision to be completely closed at once, and thus hastens convalescence. 6. It completely obliterates the pedicle stump as quickly as any intra-peritoneal method does, and more quickly than any extra-peritoneal method. (Dr. J. Knowsley Thornton, p. 293.)

PUERPERAL FEVER.—Sapræmia after labour is treated earnestly, even heroically if necessary, with a view to its own cure, and with a view to the prevention of the complications—inflammatory, septicæmic, or pyæmic—which it is very likely to bring in its train. Heroic treatment may be required to reach the remotest part of the genital tract in search for decomposing matter, or to ascertain that there is nothing but putrid lochia in the case. Mere vaginal washing may suffice, or intra-uterine washing, or the volsella may be passed into the uterus to grope for the decomposing structure, or with the same view a finger or fingers may be passed, or even the whole hand; and it may be necessary to dilate the cervix preliminarily. Most of this may be done without an anæsthetic, but where the hand is to be introduced into the vagina, the previous induction of anæsthesia is desirable. The lotion which I always use is the carbolic, of the strength of 1 in 40, or occasionally 1 in 30. It is used tepid or warm. In conducting the operation it is necessary to be very gentle, to avoid the introduction of air into the passages, and to see that the fluid runs out freely. If the os uteri externum and internum are not widely open, a pipe with double current should be used. The whole proceeding should cause little or no pain, and, for an ordinary washing, a pint or a pint and a half may be passed. But if the discharges are copious and fetid, more may be required, and the rule is to continue the injection so long as it comes away foul or perceptibly fetid. Of course, a bowl is to be so used as to receive all the lotion as it is discharged, in order to save the bed-linen from being wetted. When the uterus is washed out the medical attendant conducts the operation, but vaginal washings may be left to the nurse. The washings are to be repeated from twice to four times a day if the fetor persists in the discharges. After the fetor is suppressed twice a day is sufficient. If the discharges become natural, and if the symptoms of sapræmia disappear, the washings are stopped. In any case they are required only for a few days. These antiseptic washings constitute the great or essential treatment of sapræmia—a treatment, as already said, so direct in its action, and so successful, that it may be called a cure. Though these washings have been described by ancient authors, and though they were recommended by Harvey and by Baudelocque, it is well known to you that no such practice was in use among us till the antiseptic theory of treatment was promulgated. Yet they are not covered by the antiseptic theory, for you know it was based on the presence of bacteria which passed into the blood, and the antiseptic treatment was planned to destroy them or prevent

them reaching the wounded surface. Here we use antiseptics not with these views, but to remove and arrest putrefaction, with a view to stopping the supply of a chemical, not a living, poison, the product of putrefaction, which enters the blood and endangers the constitution. (Dr. J. Matthews Duncan, p. 279.)

Sore Nipples.—Chapped nipples are treated either by the glycerole of the nitrate of lead in a solution containing from twenty grains to one drachm to the ounce, or by a mixture of two drachms of iodoform to the ounce of balsam of Peru. The balsam is used because it disguises the smell of the iodoform. (Dublin Journal of Med. Science, Feb., p. 106.)

Sub-Involution of the Uterus.—The treatment consists in the application to the interior of the uterine cavity of a solution composed of equal parts of iodine, iodide of potassium, and spirits of wine. The first two ingredients dissolve readily in the third. The patient being in the dorsal position, a Fergusson's speculum inserted, and all mucus wiped away, it is a good plan to pass a sound through the cervical canal, as the iodine application is more readily passed afterwards. The sound used for this purpose should be curved only in its terminal half inch, or a trifle more, and this curve should be of about forty-five degrees angle in order to be easily used through a speculum. A small whalebone bougie, having its slightly bulbous extremity removed, or any long and finely tapering piece of whalebone, is to be wrapped round with cotton wool in its terminal four inches, or to a greater length than that of the enlarged uterine cavity. About two inches of this is saturated with the iodine solution, and is rapidly passed up to the fundus and there allowed to remain for a few moments. To facilitate the rapid insertion of the whalebone it should be slightly curved towards its extremity, and sufficiently fine to allow of its bending very readily. This is withdrawn in about a minute, the cotton of course coming away upon the whalebone, and being then stripped from it. The effect of the application of this powerful solution of iodine is to cause immediate forcible contraction of the uterine muscular fibre, as may be inferred from the difficulty of passing the cotton a second time soon after its withdrawal. This contraction, however, only occurs when the contractility of the muscular fibre is not lowered by inflammation. As, however, a second application should not be necessary, the contraction passes unnoticed. This solution should be applied twice between the periods, and continued according to the results. (Dr. J. Braithwaite, p. 270.)

MISCELLANEA.

ANÆSTHETICS.—At St. Thomas's Hospital nitrous oxide gas is used solely for dental operations, where the extraction of teeth, and such operations of short duration, can be performed within the space of seconds; for a prolonged use of this anæsthetic is dangerous, and therefore not applicable to any operation of magnitude.—As a rule, chloroform is administered to children under five years of age, and to adults above sixty; ether to all persons intermediate between those ages. The chief reason for which is this, that ether is given in all possible cases because of its undoubted greater safety. Ether moreover, causes an increase of the heart's action, whereas chloroform decreases the same.—Chloroform is administered to old people because the inhalation of ether produces hyperæmia of the bronchial passages to so great an extent that a fatal termination is not unfrequently the consequence. In children the same remark applies, but in reality they take any anæsthetic so remarkably well that either may be used without preference.—If chloroform is to be administered, brandy-and-water may be given beforehand, but no alcohol of any description should be given before the inhalation of ether.—In some cases it is found necessary to give an enema of egg-and-brandy during the operation, for when the patient is under the influence of an anæsthetic, the passage of fluid by the mouth is attended with danger.—When it is necessary to have a patient insensible during an operation, *always have the anæsthetic given by some one who is in the constant habit of administering it, and who will attend to that solely.*—When commencing any anæsthetic, the first inhalations should be freely diluted with air, and the patient gradually brought under the influence, for large quantities suddenly placed over the patient's mouth occasion gasping and struggling for breath.—To know when the patient is sufficiently under the influence of any anæsthetic for the operation to commence, the conjunctival surface should be touched with the tip of the finger, and if no reflex action takes place, shown by the contraction of the orbicularis palpebrarum muscle, a sufficient degree of insensibility has been produced.—Chloroform (prepared with methylated spirit, and manufactured by Messrs. Wright, Layman, and Umney) should be largely mixed with air, and for this reason it is best administered on a piece of lint folded into a cone to fit over the nose and mouth, whereby a free admixture of air is allowed.—In the removal of cataract, where coughing or struggling at the critical moment of extraction of the lens may spoil the whole operation, it is better to give ether first, and subsequently follow it up with chloroform.—Ether usually causes first a

failure in the respiration, whereas chloroform causes first a failure in the pulse.—In cases of threatening asphyxia never trust solely to thrusting the lower jaw forwards, but forcibly draw the tongue out of the mouth by forceps. Artificial respiration, after Silvester's method, must be immediately commenced and carried on until all hopes of recovery are at an end. Whether air enters the lung can be determined by the more healthy appearance of the face, as well as by hearing the air passing freely to and fro. Œdema, or spasm of the glottis, or obstruction in the trachea, must be met by immediate tracheotomy. (Mr. S. Osborne, p. 314.)

Ethidene-Dichloride.—I have made use of ethidene in hospital and private practice in almost every case requiring longer anæsthesia than that of nitrous oxide gas. My usual plan of giving it is by first getting the patient nearly unconscious by means of nitrous oxide gas, and then gradually adding the vapour of ethidene. The general features of an administration are that the patient falls asleep, without moving a limb; a little convulsive twitching is seen, and then stertorous breathing; the pupils at first dilate, about the same time that stertor commences; a very little air is now given at every third or fourth respiration, and the pupil contracts. The quantity of ethidene is regulated according to the condition of the pupil or the unsteadiness of the patient, the pulse usually remaining much less affected than when the same narcosis is produced by chloroform. The anæsthesia usually continues some time after consciousness returns, and the patient awakes almost as from natural sleep, speaking clearly. The dreams are usually pleasant, often of rapid travelling or music, and if one whistle or sing, it often guides the dream in this direction. The patient, within two minutes of being in the most profound sleep, if it have lasted only a short time, will get up and walk steadily. The non-interference with muscular co-ordination is equally striking in the act of talking. Vomiting has occurred in about one-third of the cases of major surgery, and in about one-twentieth of the minor cases. It is more likely to occur if the vapour have been strong enough to excite swallowing. Without exception, the vomiting has ceased sooner than it usually does after chloroform. (Mr. J. T. Clover, p. 319.)

Ethylen-Dichloride, with Nitrous Oxide Gas.—At a recent meeting of the Edinburgh Odonto-Chirurgical Society, Mr. Macleve brought under the notice of the members a new combination anæsthetic, which he had been using for some time past with very successful results. It consisted in combining ethylen-dichloride with nitrous oxide gas. The manner of admin-

istration consisted in placing a small piece of sponge charged with ethylen-dichloride, retained in position by a clip, within the way-tube or supplementary bag of the nitrous oxide inhaler, leaving sufficient space on each side of the sponge for the free passsge of the nitrous oxide into and out of the bag. Only about half a drachm of ethylen-dichloride was required. The time of inhalation to produce anæsthesia measured from sixty to ninety seconds, and the time of complete anæsthesia was from one minute and a half to two minutes and a half, which embraced a period of time sufficient to enable most of the operations required in the dental surgery to be comfortably performed. In all the cases in which he had used this anæsthetic, upwards of sixteen in number, there had been a complete absence of sickness, and only one case in which there might be said to have been the slightest approach to stertorous breathing. The pulse was slightly more accelerated than normal, but was full and strong, and there was no lividity, the lips alone, on the removal of the face-piece, presenting in any case, and that only occasionally, the faintest appearance of lividity. It had also this decided benefit over the single administration, that it produced a relaxation of the muscles, contrary to the almost spasmodic rigidity induced by nitrous oxide. (Mr. W. Bowman Macleve, British Medical Journal, April 17, p. 600.)

India-rubber Inhaler for Ether Anœsthesia.—I have devised an inhaler of india-rubber, which works efficiently, economises ether, and may be purchased for a few shillings. This inhaler the Messrs. Fannin had constructed for me many months ago, and since then, I may say, it has been used with almost every operation case in the Adelaide Hospital. When first made, the inhaler had no funnel. This I have recently added to avoid the necessity for raising the inhaler from the face to replenish the ether. By this addition anæsthesia may be either hastened or maintained with facility and ether still further economised. The inhaler is conoid in shape and formed of vulcanised rubber. (Mr. B. W. Richardson, p. 327.)

Leeches.—*How to get Leeches to Bite.*—The following plan will be found effectual in all cases when the leeches are healthy. Put them into a small glass vessel half filled with water. The part of the body which is to receive them is then to be carefully washed with warm water, and the glass quickly inverted upon the skin. The leeches attach themselves with surprising rapidity. When all the leeches have bitten, the glass is carefully removed, the water escaping being absorbed by a sponge. If a single leech is to be applied, the same plan is adopted, using a test-tube in place of a glass; by this

means the leech may be compelled to bite at just the point desired. (Medical Press and Circular, Sept. p. 183.)

MENTHOL.—*A New Anti-Neuralgic Agent.*—Menthol is the stearoptine of peppermint oil. It is a crystalline solid, lighter than water, and melting below the temperature of the body. It is an excellent external application in cases of neuralgia, relieving pain until constitutional remedies have time to act. A gentleman who occupies an eminent position amongst the surgeons of Edinburgh, after a personal experience of the effects of menthol in solution of forty-eight grains to the ounce of rectified spirit when suffering severely from neuralgia of the supra-orbital branch of the fifth nerve, pronounces the opinion that that solution, though only temporary in its effects, and requiring frequent renewal, is the best external application of the many he has tried. (Dr. A. D. Macdonald, p. 331.)

TONIC GLYCERINE.—There are many patients to whom cod liver oil cannot be administered, as it destroys their appetite, and produces dyspepsia. Dr. Larmande highly recommends "tonic glycerine" as a substitute for the oil in such cases. This is made by adding 30 drops of tincture of iodine, and 5 grains of iodide of potassium, to 9½ ounces (by weight) of glycerine. A tablespoonful should be taken a quarter of an hour before each meal. This generally restores the appetite, and removes constipation, if it be present. For children or delicate persons, one-sixth part of the glycerine may be omitted, and replaced by syrup of raspberries. (Glasgow Medical Journal, June, p. 500.)

VACCINATION WITH CALF-LYMPH.—*The Official Introduction of.*—The announcement with regard to animal vaccination which Mr. Dodson made in the House of Commons on behalf of the Ministry, on the 11th instant, is one upon which the Government and the profession are alike to be congratulated. Mr. Dodson, replying to Dr. Cameron's request that the National Vaccine Establishment should supply animal lymph for the use of those who prefer it to humanised lymph, promised that the department should make arrangements by which animal lymph might be supplied as stock to medica practitioners as they might desire. The only limitation which Mr. Dodson made to this concession was that it would be necessary for the Establishment to start their new lymph-providing arrangements from a well-established case of spontaneous cow-pox: a matter which can hardly be difficult, in view of the exact records which are kept at the continental stations, notably at Dr. Warlomont's in Brussels, of the pedigree of the animal lymph now used. We may assume, therefore, that, in the course of a very short time, any practitioner

who desires to revive his stock of lymph by recourse to the calf will be able to carry out his wishes by an application to Whitehall. It cannot be doubted that a large and increasing number of practioners will avail themselves of this new boon, which promises, indeed, to remove one very solid ground of objection from vaccination altogether; viz., that of the alleged inoculation of other diseases. (Editor of British Medical Journal, June 19, p. 932.)

Vesicant Collodion.—Dr. Hisch (Union Médicale) gives the following directions for this preparation: ℞. Cantharides pulverised, 100 grammes; sulph. ether, 150 grammes; acetic acid, 20 grammes. Mix and decant. In the saturated liquor of cantharadine thus obtained, dissolve 1 gr. 30 cgr. of gun cotton to 60 gr. of the tincture. The action of this epispastic collodion is but slightly painful, confined to the exact spot to which it has been applied, and rapid, producing vesication in a few hours. (Glasgow Med. Journal, June, p, 506.)

Waterproof Paper.—*A Substitute for Oil Silk.*—Dr. Keen, of Philadelphia, has after many trials succeeded in having fabricated, by Seabury and Johnson, of New York, a paper coated with a combination of paraffin and caoutchouc, now sold under the name of "Mead's Surgical Dressing Paper." It is expected that the "waterproof paper" thus produced will supersede everything of the kind, being far superior in its qualities and far less expensive than oiled silk, oiled muslin, taffeta oiled silk, paraffin paper, waxed paper, and gutta percha tissues. It is impermeable to water after an exposure of at least seventy-two hours, and even after being repeatedly crushed and crumpled in the hand; it is impermeable to air even when bruised; it does not absorb water or discharges; it may be used with the hottest dressings that can be borne; although very flexible, it is strong enough for all ordinary wear, especially since it will be used only once. In Lister dressings it will prove very economical as a substitute for the macintosh cloth. Dr. Jones, of Ohio, says that "it provides an excellent substitute for rubber tissue or oiled silk, at a trifling cost as compared with these articles. Besides its use in surgery, the practitioner of medicine can make this paper available as a covering for wet applications, whether general or local, and give his patient the benefit of a continuous bath, when desirable, with a trifling amount of trouble and cost. Dr. Keen is entitled to the gratitude of the profession and our patients." Its cost is many times less than that of similar dressings, the price being four dollars for a roll of a hundred yards, or in small quantity 7 cents a yard. (Boston Medical Journal, April 22.)

PRACTICAL MEDICINE.

DISEASES AFFECTING THE SYSTEM GENERALLY.

ART. 1.—ON THE ANTIPYRETIC TREATMENT OF TYPHOID FEVER.

By Dr. WILLIAM CAYLEY, Physician to the Middlesex Hospital, and to the London Fever Hospital.

It is not intended here to give a description of the various methods which have been from time to time introduced for the specific treatment of typhoid fever; they have most of them again, sooner or later, fallen into disuse, till at last a complete scepticism on the effects of treatment in this disease has been proclaimed by many of the highest authorities. Thus Skoda says it makes no difference whether we do or do not administer remedies; and the same opinion has been expressed by many others.

Of late years, however, a plan of treatment has been revived, which aims at controlling the fever and preventing its injurious effects on the organism by keeping the temperature throughout the whole course of the disease under a moderate febrile heat.

Typhoid fever can hardly be looked upon as a malignant disease; upwards of 80 per cent. of the cases, if properly nursed and fed, will recover; and those who die are rarely struck down at once, overwhelmed by the virulence of the poison, but usually succumb after a protracted struggle. Hence it seems only reasonable to suppose that if we can succeed in striking out one of the factors adverse to the patient, even if it be not the most important, this will generally suffice. So evenly is the balance poised in most cases between life and death, that the removal of the smallest weight from the opposite scale will give the preponderance to the side of recovery.

Now, the factor in typhoid fever which is most under our control is the febrile heat: it lies in our power to prevent the temperature throughout the whole course of the disease from rising above a very moderate height; and hence we may obviate those injurious effects which are directly or indirectly caused by the febrile state as such. The great acceleration of the pulse and breathing, the febrile oppression and malaise, the dry brown tongue, the thirst, the headache, the delirium, the stupor—may all be controlled. Nay, not only can we prevent the accession of these symptoms, but sometimes we can remove

them after they have supervened. And, as a result, the granular degeneration and softening of the various organs and tissues, and the febrile consumption itself, may be in part checked.

Therefore, from Hippocrates downwards, to reduce the temperature has at all times been regarded as one of the most important indications of the treatment of fever. It would seem, then, that all we have to consider is how far we are able to effect this, and whether the means which we employ are in themselves devoid of danger; and I think a sufficient amount of evidence has been now accumulated to answer both these questions.

With regard to the first, it can be experimentally shown that by the repeated application of cold to the surface of the body—chiefly by means of cold water on the one hand, and on the other by the administration of certain drugs which have the property of reducing temperature, the most important being quinine, salicylate of soda, and digitalis—the febrile heat can almost always be controlled.

Such being the case, the second and more important question arises, Is it always, or even generally, a safe and expedient proceeding? We must accordingly apply to it the two tests I have mentioned above—first, whether it seems to relieve the symptoms and exercise a favourable influence on the course of the disease; and secondly, whether it diminishes the general rate of mortality.

The history of the introduction of what is now called the antipyretic treatment of fever is a very interesting and instructive one. The first person who treated febrile diseases by systematically reducing the temperature by cold affusions was the celebrated Dr. James Currie, and he seems to have been induced to try this method by the account published by Dr. Wright of an outbreak of typhus on board ship. Dr. Wright himself caught the disease, and, finding that the cold air of the deck relieved the febrile oppression, caused himself to be treated by cold affusions, and with such good results that he applied the same method to a passenger at his own request.

Dr. Currie, as is well known, systematically treated by cold affusions, and sometimes cold baths, a great variety of febrile diseases, especially typhus, typhoid, and scarlatina, making careful thermometric observations, and he laid down rules by which we may still guide ourselves. It is interesting to see how soon he discovered that although, when applied late in the disease, this method would occasionally rescue the patient from a condition apparently desperate; nevertheless, to insure success it was absolutely necessary to have recourse to it at the very onset, before the fever had, as it were, got the upper hand.

Although he does not expressly remark the lability of the

temperature in fever, he was, nevertheless, quite aware how easily it may be raised or depressed by external agencies; and he describes a striking instance of a case of typhus where he caused a patient, who in his delirium had thrown off all his bedclothes, to be stripped of his shirt, and exposed, in a state of nudity, to a current of cold air from an open window. The effect was to reduce his temperature from 104° to 101°, to calm the delirium, and to throw him into a quiet sleep.

Dr. Currie soon had numerous followers, both in this country and on the Continent. Thus, Dr. Gregory applied it with great success in small-pox; Desgenettes, in Egypt, during an epidemic of plague, having witnessed the unexpected recovery of a patient who, in his delirium, threw himself into the Nile, was led to apply the cold bathing treatment with great success in this disease.

Giannini in 1805 became an ardent advocate of Currie's method. In 1813, after the retreat from Russia, a fearful epidemic of fever broke out among the troops and spread among the civil populations. At Berlin it raged almost with the virulence of the plague, and, in the hope of doing something to check its ravages, Dr. Horn, the director of the Charité Hospital, determined to follow the plan of treatment recommended by Currie. The results were most satisfactory, and fully confirmed Dr. Currie's experience. Since this time the treatment, though very imperfectly applied, has never quite died out in the Charité at Berlin.

In 1821 the celebrated Priessnitz, of Graefenberg, founded what is commonly known as the cold-water cure. He was a man who had all the qualifications necessary for a successful empiric. He was entirely ignorant of science and medicine, of great common sense, self-confident, and a firm believer in his own system. In consequence he soon became the fashion, and all the celebrities of Germany crowded to Graefenberg to be cured of all manner of diseases. Now, there can be no doubt but that Priessnitz met with the most remarkable success in the treatment of acute febrile diseases, especially pneumonia. His plan was to immerse the patients in a shallow bath, and keep them in it sometimes for several hours—the effect being, of course, to subdue the febrile heat, and so relieve the most urgent symptoms. When we remember that the orthodox mode of treating pneumonia at this time was free bleeding, tartar emetic, and calomel, we must confess that the empiric was far in advance of his time.

Chomel practised the treatment in typhoid fever, Graves and Trousseau in scarlatina.

In 1850, Dr. Armitage, after visiting Graefenberg, with the consent of Professor Schoenlein, and in conjunction with Dr.

Traube, treated a large number of cases of acute disease, especially typhoid fever, in the Charité Hospital at Berlin, again with the most remarkable success. And on his return to England he published the results in a small work called "Hydropathy in Acute Disease." It is impossible to read this book without at once seeing the great advantages of this method. Nevertheless, it failed to obtain the recognition of the profession, and the treatment of Currie may be said to have died out in the land of its birth. The reasons for this are not far to seek. In the first place, it conflicted with popular and professional prejudices; and in the second, it is somewhat difficult to carry out.

Now, when facts conflict with prevailing theories they are pretty sure to be ignored; and the prejudice that patients with fever are injuriously affected by cold is perhaps more deeply ingrained in human nature than almost any other. This theory or prejudice is by no means confined to the vulgar; it is largely shared—often, no doubt, unconsciously—by the profession. I expect most practitioners would be horrified at the idea of exposing a patient, prostrate and delirious from typhus, to a cold draught from an open window, in a state of nudity; and yet by this means Dr. Currie at once relieved the threatening symptoms, and the patient made a good recovery. Usually when we are called to a case of fever we find the patient warm in bed, covered by several blankets, a good fire in the room, all draughts carefully excluded, and everybody anxious lest he should catch cold. I have seen a case of typhoid where the temperature was 105°, and there were five blankets on the bed. Now, in health it makes little or no difference to the internal temperature of the body whether there are five blankets or none, but in the labile temperature of typhoid fever it not unfrequently means a difference of 2°.

The revival of the antipyretic treatment must be ascribed to Dr. Brand of Stettin, whose method, variously modified, has now been adopted by most of the leading physicians in Germany, Austria, and Switzerland; and the number of cases thus treated is now so large that the results may be fairly estimated. Dr. Brand,[1] in the last edition of his work, has collected upwards of 8000.

From Germany the treatment was introduced into France in a remarkable manner. Among the French prisoners in the late war who were confined at Stettin was Dr. Glénard, a clinical assistant at Lyons. An epidemic of typhoid broke out among the prisoners (23,000 in number), and ninety-three French soldiers were attacked. They were all treated by Dr. Brand according to his method, Dr. Glénard (certainly no partial witness) assisting, and they all recovered. Considering the

very high rate of mortality of typhoid fever in times of war amongst troops depressed by hardships and dispirited by defeat and imprisonment, such a result naturally filled Dr. Glénard with enthusiasm, and on his return to Lyons he introduced this mode of treatment into the Lyons Hospital, again with the effect of greatly reducing the rate of mortality; and it has since been extensively tried by many of the leading French physicians.

In England, since Dr. Wilson Fox published instances of hyperpyrexia treated by the cold bath, its utility in this affection has been generally acknowledged; but the systematic treatment of fever from its commencement in this manner seems at present only to have been tried tentatively in this country. Where it has been so tried the results have been most satisfactory. I may refer to the series of cases reported by Dr. Ord in the St. Thomas's Hospital Reports. Though the treatment, according to Dr. Brand's view, was only partially carried out, the mortality was decidedly diminished.

Dr. Edes, of Boston, introduced the treatment into America, and he also speaks most highly of it.

Such, then, is a short and imperfect sketch of the history of this method of treatment. I now propose briefly to describe the manner of applying it, and the results obtained by it.

The principle underlying the treatment is to keep the temperature throughout the whole course of the disease, from its very commencement to its termination, under a moderate fever heat, and the means employed to effect this are, in the main, abstraction of heat by the application of cold water, supplemented by the use of the drugs I have mentioned, though Dr. Brand is of opinion that the more we confine ourselves to the former and the less we use the latter, the more favourable are the results obtained.

The modes of applying cold water are the cold bath, cold affusion, cold packing, cold compresses, and the graduated bath, which consists in placing the patient in a warm bath and gradually cooling it down. Each of these methods is adapted to special cases, but for general use the cold bath is by far the best and the least troublesome to apply, and the rule for its use is this: whenever the patient's temperature exceeds 102·2° he should be put into a bath. It must be remembered that Dr. Brand always takes the temperature in the rectum. If we measure in the axilla, a somewhat lower height must be taken. He insists very strongly on the great advantages of rectum over axillary measurements, and there can be no doubt but that he is right; but I am so convinced of the impossibility of taking rectum temperatures six or eight times a day in this

country, even in hospital practice, that, except under special circumstances, I never attempt to do so. Next with regard to the temperature of the bath. This must be regulated according to the patient's condition and the effect we wish to produce. As a rule it should not exceed 70° Fahr., and may often be advantageously much lower; 65° to 70° may be taken as the average limits. The duration of the bath must also be regulated by the patient's condition and the effect it produces. We ought to cause a reduction of at least two or three degrees, and if this is not obtained the next bath must be colder or longer. It must be remembered that the temperature usually continues to fall for some time after removal from the bath; it is therefore not necessary to take the temperature in the bath itself, but it should be done about half an hour after. The bath should be prolonged for some little time after distinct shivering has begun, watching, of course, the effect on the circulation. Usually the bath will be well borne for from ten to twenty minutes. The patient should then be put to bed, wiped dry and covered with a blanket. In many cases it is advisable to give some brandy or other stimulant before or during the bath.

In severe cases the cooling effect of the bath often only lasts about three hours; therefore the temperature should be taken every three hours by day and night, and whenever the temperature rises to 102° the bath should be repeated. The number of baths required will vary with the severity of the case. The rapidity with which the temperature rises after the bath is one of the best indications which we possess of the impression which the fever has produced on the nervous system. It would be a great mistake to suppose that the only or even the principal effect of the bath is to abstract a certain amount of heat from the body. It exercises a most powerful influence on the central nervous system, especially on the vasomotor centres, and stimulates them to a resumption of their heat-regulating functions. This is shown by a well-known experiment. Heidenhain found that stimulation of the sciatic nerve of a dog under curare caused a fall of nearly 2° Fahr. in the temperature of the internal organs, but that this fall did not take place if the animal was fevered; if, however, when in this state it was first cooled by being placed in a cold bath, the usual fall took place.

When, as is not very infrequent, we meet with cases of typhoid in which there is stupor and great nervous depression, subsultus tendinum, and meteorismus, with only a moderate elevation of the temperature, the stimulating effect of the bath on the nerve-centres is of more importance than its refrigerating effect, and in such cases a cold bath of short

duration, or cold affusion, is indicated. In other cases a more prolonged bath of higher temperature is required for the more complete abstraction of heat. As soon as the immediate effect has passed off, the patient should be lightly covered with a sheet and thin counterpane, and perhaps a blanket over the feet, but all general woollen coverings should be strictly forbidden. During the past cold winter I never allowed even a single blanket to a patient with typhoid in the Fever Hospital as long as the temperature was raised. In other respects the ordinary regimen should be observed. Abundance of cold drinks should be given; if there is headache, an ice-cap may be applied; if meteorismus or abdominal pain, a cold compress to the belly. Dr. Brand strongly recommends the use of cold compresses between the baths in all cases.

The other modes of abstracting heat are inferior in their effects, and are indicated in those cases where, from any reason, the cold baths are inadmissible. The graduated baths are useful in persons advanced in life, in cases of extreme prostration, where there is organic disease of the heart or lungs, where there is a tendency to syncope, or where—which is not often the case—the patient has an invincible repugnance to the cold baths. As an exclusive mode of treatment they would be found impracticable, especially in private houses. Six or eight hot baths daily would be found to overtax the resources of most middle and lower-class establishments; whereas the cold bath may be kept ready in the room, and the water need only be changed once or twice daily, a little warm water being added each time before it is used, or in hot weather some ice. Cold sponging and cold affusion are especially adapted to the milder cases, and the former together with iced compresses when, from hemorrhage or peritonitis, we are afraid to move the patients. Cold packing is very inferior to bathing as a means of reducing temperature, and very troublesome to apply, but is sometimes more readily submitted to.

Liebermeister, Jürgensen, and most of the physicians who practise the antipyretic treatment, supplement the cold baths by the administration of those drugs which have the effect of lowering the temperature, especially quinine, salicylate of soda, and digitalis. Brand, however, deprecates their use, and only employs them where bathing is inadmissible. The great advantage they afford is that of diminishing the frequency of the baths, but they do not produce so favourable an effect on the nervous system, and sometimes themselves cause unpleasant symptoms. Their great use, then, is as adjuncts to the bath, but they cannot be employed generally as substitutes.

The most important of these remedies is quinine. It probably reduces temperature by diminishing oxidation, its effect

being to impair the oxygen-carrying powers of the red blood-globules. Quinine is very rapidly eliminated by the kidneys, and in order to obtain the antipyretic effect it is necessary that the blood should be highly charged with it. For this purpose, then, it is useless to give small doses at considerable intervals. One large dose should be given at once, or in divided portions within half an hour. To produce a decided fall of temperature in an adult, from thirty to forty grains are usually required. I generally give ten grains in suspension every ten minutes till the required amount has been taken. This will often depress the temperature three or four degrees, and this depression is often prolonged for many hours. It is best given at night-time, when the evening exacerbation is subsiding, or after the temperature has been lowered by a bath, as it exercises a greater effect on a falling than on a rising temperature. Given in doses of thirty or forty grains in typhoid, quinine often causes some of the disagreeable symptoms of cinchonism, as deafness and singing in the ears. These, however, are of little consequence; a far more serious effect is vomiting, which sometimes follows its use. This may be sometimes prevented by combining it with opium and administering ice.

Salicylate of soda, given in large doses, has a more powerful effect in depressing temperature even than quinine, and acts more rapidly. It has very largely replaced quinine in the treatment of typhoid fever in Germany, but after a pretty extensive trial of it, it appears to me to possess all the disadvantages of quinine, and in addition it often has a very depressing effect, so that I now never give it where there are symptoms of prostration or failure of the circulation.

The only other of these antipyretic drugs of which I have any experience is digitalis, and it appears to be universally well spoken of. Dr. Murchison, who had very little faith in the advantages of quinine, says that digitalis is far too much neglected. The antipyretic property of digitalis is probably due to its action on the vaso-motor system. The primary effect is to stimulate the vagus and so to slow the heart; in larger doses it accelerates the heart by paralysing the vagus; and in still larger doses it brings the organ to a standstill by directly paralysing its muscular fibres. With these effects it causes contraction of the small arteries, and so increases the blood-pressure in them and diminishes that in the veins. This effect appears not to be due to its action on the vaso-motor centres, but to its direct stimulation of the peripheral nerves. Now, this contraction affects the internal arteries, especially those of the mesenteric system, much more than it does the superficial vessels; hence the blood is diverted from the heat-producing to

the heat-dissipating organs, and consequently the temperature falls.

Considerable care is required in giving digitalis as an antipyretic in fever. We must administer full doses, or no effect is produced on the temperature; but we must be very careful not to go beyond the first degree of its action on the heart. When so given, it diminishes the frequency and improves the tone of the pulse, and tends to counteract that general arterial relaxation which is so marked in severe fever, and at the same time it lowers the temperature. It is, however, a dangerous remedy where the heart is softened by acute granular degeneration, and therefore ill adapted for use in the later periods of fever, when the protracted high temperature has already caused more or less of the change to have taken place in the heart.

Such, then, are the principal means at our disposal for keeping the temperature down during the course of typhoid fever. *Medical Times and Gazette, April* 24, 1880, *p.* 443.

2.—THE ANTISEPTIC TREATMENT OF ENTERIC FEVER.

Dr. Rothe (Deutsche Med. Woch., 11 and 12, 1880) ascribes an intense "antipyretic" action to the combination of iodine and carbolic acid. A comparison of nineteen cases of enteric fever treated by this combination shows that in all alike first the pulse, and then the temperature sank, within from two to seven days—the pulse frequently below the normal, without ever rising to its former height except when the medicine was discontinued, or given less frequently by way of experiment. The tongue assumed in none of the observed cases that dry, brown, hard, and crusty surface, which is usually a constant symptom in severe cases, and the gastric symptoms subsided at the latest in the beginning of the second week, being followed by moderate appetite, and a feeling of comfort. Rothe draws attention especially to this condition, in order to ascertain, by further experiments, whether this is also an invariable result of the combinations of carbolic acid and iodine. The effect on the fever seems to take place, sooner or later, between two and ten days, according to the intensity of the infection (general symptoms). Quinine was not given in any case. How can this "antipyretic" effect be explained, if it be true? Does a direct influence on the vascular activity take place, as with the digitalis, through stimulation of the vagus or of the cardiac ganglia? or is the cessation of the fever a secondary result, its cause being gradually removed or overcome? Dr. Rothe thinks that both explanations are valid. The febrile action in enteric fever is undoubtedly in direct proportion to the morbid process in the small intestine, the seat of the local, and the source of

the general infection. With this centre of infection, the iodine and carbolic acid, being hourly introduced, comes into more or less direct contact, especially after previous evacuation of the intestine; and then the question arises as to a direct development of the antiseptic—the bacterium-destroying—quality of this remedy. The medicine itself is readily taken by the patients, both children and adults, and indeed for weeks, which cannot be said either of quinine or of salicylate of soda. Oil of peppermint completely disguises the disagreeable smell; and gastric or sensorial disturbances, which sometimes attend the use of the above-mentioned remedies, were never observed. The medicine has also the recommendation of cheapness—a very important circumstance in view of the present high price of quinine. It seems important that the remedy should be given in sufficient quantities (1 to 2 of carbolic acid, and 1 of tincture of iodine, in 120 of water), a tablespoonful being given hourly, until a decided effect on the pulse and temperature is produced, and then every two hours, until apyrexia follows; and it should be continued for three or four weeks. Whether the carbolic acid, without iodine, has the same effect, Dr. Rothe does not know. For the last ten years he has used the combination of carbolic acid with iodine in phthisis, diphtheria, diarrhœa, &c., and has never ventured to give up its use.—*London Medical Record; and Dublin Journal of Medical Science, Oct.* 1880, *p.* 363.

3.—DRYSDALE ON PYREXIN OR PYROGEN.

By Dr. William Murrell.

Dr. Drysdale, in a pamphlet "On Pyrexin or Pyrogen as a Therapeutic Agent" (Baillière, Tindall, and Cox, 1880), says that his attention was directed to the subject by a statement made by Dr. Burdon-Sanderson (British Medical Journal, Feb. 13, 1875), that we know of no therapeutic agent, no synthetical product of the laboratory, no poison, no drug, possessing the property of producing fever, the only liquids having this endowment being such as either contain bacteria, or have a marked proneness to their production. This fever-producing agent is a chemical non-living substance formed by living bacteria, but acting independently of any further influence from them, and formed not only by bacteria, but also by living pus-corpuscles or the living blood, or tissue-protoplasm from which these corpuscles spring. This substance, from being formed by bacteria, is known as sepsin, and also from its origin from pus, and its fever-producing power, as pyrogen. Dr. Drysdale suggests that if employed as a therapeutic agent it might be called pyrexin. He considers that as

it is capable of producing idiopathic pyrexia with certainty, and as the result of a given dose, it should be a remedy of great value, especially in those conditions and blood disorders to which its action corresponds pathologically. From a series of experiments on dogs by Dr. Burdon-Sanderson, it was found that after the administration of a sub-fatal dose of pyrogen, the animals shiver and become restless, the temperature rises two or three degrees, there is great muscular debility, and thirst and vomiting come on, followed by feculent and thin mucous or sanguinolent diarrhœa with tenesmus. These symptoms begin to subside in four or five hours, the animal recovering its normal condition with wonderful rapidity. Special stress is laid on the last point, as indicating that the poison has no tendency to multiply in the organism. In man, the symptoms produced are substantially the same as on the lower animals; the effect of a large dose of sepsin, given experimentally, being practically identical with the septicæmia familiar to us in surgical cases. Dr. Drysdale considers that pyrexin may be expected to act therapeutically as an alterative in diseases presenting a typhus or typhoid character, using these terms in their old-fashioned sense. As aconite is used in inflammatory fever, he considers that the best mode of expressing the indications for the use of pyrexin would be to term it the aconite of the typhus or typhoid quality of pyrexia. This is a condition and not a disease, and its occurrence may be looked for in the course of typhus and enteric fevers, scarlatina, measles, small-pox, dysentery, pneumonia, diphtheria, etc. It is recommended at certain stages and phases of these diseases, and solely as a remedy of a secondary or subordinate character, and not in any sense as a specific for the whole disease. Our expectations of this remedy, we are told, must not be pitched too high, seeing that a considerable mortality must of necessity attend all severe cases of specific fever, the margin wherein positive curative treatment adds to the value of good negative treatment not being large. Moreover, from the character of the symptoms and the stage of the disease for which it is indicated, it must often be in the position of a forlorn hope. In some chronic diseases, such as leucocythæmia and pernicious anæmia, and in cases where there is a tendency to the formation of boils, whitlows, and abscesses, it might prove of value. Dr. Drysdale gives three formulæ for the preparation of sepsin, of which the following is recommended. Half a pound of chopped lean meat is allowed to macerate in a pint of water in the sun for a fortnight or three weeks. It is then reddish, thick and fœtid, and must be filtered. The filtered liquor is evaporated to dryness in a water bath. The dry residue is next rubbed up in a glass mortar with two ounc

of rectified spirit, and allowed to digest for two hours. This spirituous maceration is then boiled and filtered. The residue is next thoroughly dried in a warm chamber, rubbed up in distilled water, allowed to stand, and again filtered. The clear fluid that passes through is the watery extract or solution of sepsin. To this is added twice its volume of glycerine, forming pyrexin, the standard solution of sepsia, of which one minim corresponds to the watery extract of $\frac{1}{30}$ of a grain of dry sepsin. It is a difficult substance to prepare, and, to ensure uniformity of strength and quality, pyrexin is kept in stock by Messrs. Thompson and Capper, of Bold Street, Liverpool, from whom it may be obtained. On testing, by subcutaneous injection in white mice, in quantities of from one minim upwards, it was found that one, two, and three minims produced palpable effects, though not fatal; while four minims were fatal in some cases, and six minims were uniformly so. The preparation was tested on mice, because it has been shown by Koch that the symptoms they present, when injected with the septic and anthrax poisons, correspond closely with those observed in man. The animals became dull and languid, and ceased to eat; next appeared restlessness, dimness of the eyes, bleeding from the anus, and finally ensued a quiet stupor and death. Bleeding from the anus was perceived in all fatal cases, but also in some that recovered. The blood of the animals thus killed was tested by injecting it into healthy mice, which, in every instance remained unaffected. This is regarded as a proof that we are dealing with a simple non-reproducible chemical poison, the effects of which can be regulated and kept within bounds by limiting the dose. As it is an animal poison like snake-venom, it may be necessary to use it subcutaneously, as we do not know how far the secretions of the stomach may impair its activity. As the influence of sepsin is speedily exhausted, it would probably be necessary to repeat the dose at least twice a day in acute diseases; and from the nature of its possible curative operation, we should not expect a rapid action, but only a gradual amelioration of the disease. As sepsin is probably of the nature of peptones, and extremely favourable to the growth of bacteria, it should for internal administration be prescribed, not in an aqueous mixture, but in pure glycerine, or in glycerine with a third of distilled water, the dose being dropped into a spoonful of water at the time of administration. It is said that the injection of the strong glycerine preparations excites neither local disorder nor general septic disturbance.—*London Medical Record, July* 15, 1880, *p.* 260.

4.—NOTES OF A CASE OF HYPERPYREXIA.

By Dr. G. H. Philipson, M.A., Senior Physician to the Newcastle-upon-Tyne General Infirmary, &c.

A. B., aged twenty-three, unmarried, a domestic servant, was admitted into the Newcastle-upon-Tyne Infirmary, under my care, on July 4th, 1879. From information obtained from her mother, the patient's life during the past three years had been one of difficulty and hardship. In former years the patient's parents had been in good circumstances, but through misfortune their children had been obliged to enter service to gain their livelihood. Three years ago the patient had suffered from an attack of rheumatic fever, and then her medical attendant had been obliged to have recourse to narcotic remedies, but had strictly enjoined that she had not to take more than was absolutely necessary to relieve her suffering. Contrary, however, to his injunctions, she had taken them in large quantities, and suffered in health in consequence thereof. She also habitually would drink spirits of camphor, eau de Cologne, or anything spirituous in nature. She obtained large quantities of chlorodyne and other narcotic preparations unknown to her parents. She could not remain easy for more than half an hour without taking something stimulating or sedative in nature. She pawned silver articles and linen goods, and even her own clothes, to obtain chlorodyne. She sometimes would lie for hours in a deep sleep, and then would become frenzied, threatening to make an end of herself. If she was not able to obtain chlorodyne or some other narcotic or stimulant, she became very depressed. According to her own version, she took these substances for the purpose of relieving the severe pain from which she suffered. She admitted that she had taken as much as five teaspoonfuls of Collis Browne's chlorodyne at one time.

In March 1877 she was three weeks confined to bed, with a severe pain in her left side, the severity of which, upon several occasions, produced fainting. The pain became more severe, especially after movement or exertion, and in order to obtain relief she resorted to a mixture of ether, ammonia, and opium, which she was in the habit of taking, and without which she said she could not exist. Her sight at this time would become dim, and for days she was almost blind. Her medical attendant becoming alarmed lest any hurtful result might arise from the careless self-administration of these uncertain medicines, forbade the chemist to supply her with them. However, it was discovered that subsequently she had procured the same articles from other chemists.

The patient was a young woman of medium stature, stout and

of pale sallow complexion. Her countenance was dull and heavy; she was inert, easily excited, and highly sensitive. She complained of great pain in the chest and back, which was greatly intensified when the cuticular surface was touched. The pain was more especially associated with the intercostal muscles, was constant and very severe, and was worse at night and in the early morning. In the middle of the sternal region, in the left axilla and at the left side of the vertebral column, the tenderness was extreme. There was general hyperæsthesia of the surface, but the sensitiveness was most marked over the back and especially the left side. The skin generally was hot and dry; during the night, and at times during the day, she sweated profusely; the sweat was very sour and disagreeable in odour, and was strongly acid in reaction. She complained of great thirst, the tongue was thickly coated, micturition was difficult, and sometimes for a whole day no urine was voided. The urine was very dark, contained a copious sediment composed of urates and phosphates; its reaction was strongly acid, specific gravity 1030, and contained neither albumen nor sugar. The bowels were constipated. The catamenia had been absent for four months. The heart-sounds, base and apex, were sharp, but were without murmur; no friction, pericarditic or pleuritic, or other adventitious sound, was heard upon auscultation. The pulse was 84, and the respirations were 18 in the minute.

The case was regarded as one of hysteria, associated with amenorrhœa and intercostal neuralgia. She was placed in bed between blankets, and was ordered the milk diet, consisting of three pints of milk and boiled rice, with two bottles of potash-water, each day. She was also prescribed the compound iron and aloes mixture, three times each day.

During the first few days after her admission, there was not anything particular to note concerning her state, with the exception of the temperature, which became abnormally high. On the evening of July 7th it was 101° F., and on the evening of the 9th it became 112°. The following morning the temperature was 112°, and on the evening of the 11th it was again 101°. For the next three days the temperature remained between 100° and 103°. On the evening of the 16th the temperature again rose to 111°, and on the morning of the 18th it fell to 100°, and on the evening of the same day it rose to 112°. Three days after her admission, on account of the very high temperature and of the increased severity of the pain, Dr. J. D. Dixon, the senior house-surgeon, deemed it expedient to substitute for the iron and aloes mixture, twenty grains of the salicylate of soda in an ounce of water every four hours.

Notwithstanding the continuation of salicylate of soda, the pain became so intense that it was decided to administer mor-

phia hypodermically. At first one-quarter of a grain of the acetate of morphia was employed, by which she was much eased. After repetition, however, the effect was less marked, yet she was always most solicitous for the administration, and became much excited if it was postponed, a course which was considered expedient.

On July 24th the temperature in the left axilla was 117°, the highest recorded. On this day, in the right axilla, the temperature was 110°, and in the mouth 102°. On July 28th the temperature in the left axilla was again 117°, whereas in the right axilla it was 114°, and in the mouth 112°. On July 29th the temperature in the right axilla was 115°, the highest recorded in this situation, whereas in the left axilla it was 110°, and in the mouth 116°, the highest recorded in this situation.

Respecting the precautions taken as to the thermometric observations, it may be stated that the thermometers were placed and removed by the clinical clerk, and often under the direct supervision of the senior house-surgeon. Further, that on account of the excessively high temperature three thermometers of greater range than usual were specially obtained from Brady and Martin, of Newcastle-upon-Tyne, and employed. These three thermometers were fixed at the same time, one being placed in the mouth and one in each of the axillæ. The temperatures in the evening were always taken previous to the administration of the hypodermic injection. During the time the thermometers were in position, a nurse was placed at the patient's bedside, and was instructed to watch carefully for, and to prevent any, movement of the arms of the patient. Occasionally the patient was sullen and obstinate, and it was impossible to persuade her to allow the temperature to be taken.

On July 26th the salicylate of soda was omitted, and she was prescribed ten grains of the sulphate of quinine, with diluted sulphuric acid and water, three times each day.

At this time the sour smell of the perspiration became more intense, the hands were unsteady, and the skin commenced to peel off the fingers. On the surface of the trunk a roseolous eruption was also noticed. Her lower extremities were cold and she had shiverings. She also complained of severe pain in the head and face. For several nights she was very violent, and caused much disturbance in the ward.

As she continued to complain much of the pain in her head and face, on July 28th four decayed molar teeth were extracted. During their extraction she remained perfectly quiet. Shortly afterwards she said, "No one knows what a woman can do when she is determined," and then she fainted.

During the remaining days of her stay in the hospital she

became exceedingly troublesome, and gave rise to much discomfort to the other patients, so much so that it was necessary for her mother to be sent for, and to be requested to remove her from the infirmary. She threatened to make away with herself, and required constant and most careful watching. On the evening preceding her departure the temperature was 98°, while five days before it had been 117°.

The temperature of the atmosphere during the whole time was always between 50° and 60°.

About the middle of September 1879, the patient returned to the infirmary to visit a friend in the female ward. From the nurse's account, she appeared to be in good health, and looked well.

Remarks.—As has been recounted, upon admission the diagnosis was entered as hysteria, associated with amenorrhœa and intercostal neuralgia, and the sequence of events shows that the view taken was correct. The treatment was ordered accordingly. Subsequently, however, when the excessively high temperature was registered, the acuteness and the severity of the suffering indicated the propriety of the administration of remedies antipyrexial in nature; but, as was clearly manifested, without any distinctive influence. The most important point of interest unquestionably was the excessively high temperature. The highest temperature registered was 117°, 19° above the normal temperature of health. Occasionally cases of very high temperature have been recorded. Of such, excluding those the result of spinal injury, or after surgical operation, the following may be specified.

Wunderlich "refers to a case, in a girl aged eighteen, who was often attacked with partial hyperæmias, urticoid eruptions, local sweatings, and very changeable and varied symptoms in different internal organs. Besides this, at other times than the local hyperæmias of the skin, she exhibited all over the body, from $\frac{1}{5}$° to $\frac{1}{2}$° C (=·36 to ·9° Fahr.) higher temperature than in the vagina, in the right axilla, as well as in the right groin, there was a persistently higher temperature than in the left, the difference being sometimes as much as 1° C (=2·7° F.) The highest temperature in this case was 103·1° Fahr. This very remarkable behaviour of the temperature, which lasted almost a year, could scarcely mean anything else but a disturbance of the vaso-motor nervous system, which, whilst it affected both sides, affected the right much more than it did the left."

Dr. Graham Steel, of Manchester, has recounted a case that was under his care in the Manchester Royal Infirmary, in a female, aged twenty, suffering from hysteria, in whom the temperature was over 116·4°.

Dr. Horatio Donkin, of the Westminster Hospital, reported that, in a female nurse, aged nineteen, during an attack of enteric fever, the temperature was over 111°.

The other points of interest, in reviewing the case under consideration, would appear to be the non-persistent character of the hyperpyrexial condition, its want of uniformity over the surface of the body, and the slight prejudicial influence of the condition upon the patient.

The non-persistent character of the hyperpyrexial condition was very remarkable, and would appear to be of significant importance in estimating the amount of actual danger to the sufferer. Often the exaltation of temperature was of very short duration; a second observation taken very shortly after the registration of a high degree might again be high, or, on the contrary, be of a lower degree, or even be the normal temperature of 98°. Respecting the want of uniformity of the temperature over the surface of the body, it was no unusual circumstance for the difference to amount to several degrees. As an illustration of this anomaly the following instance of the state may be referred to. On the 24th of July the temperature in the left axilla was 117°, that in the right axilla was 110°, and that in the mouth was 102°. This non-correspondence was no unusual circumstance. It was also distinctly associated with a corresponding difference in the hyperæsthesia. The exaltation of sensitiveness was generally most marked on the left side of the spine, the left side of the thorax, and the left arm. This want of uniformity of the temperature, conjoined with a difference in the hyperæsthesia, may be inferred to be another indication that the individual was in no imminent danger.

Regarding the apparently slight prejudicial influence of the high temperature upon the state of the patient, it is to be remembered that while the temperature was so increased as to be considered almost incompatible with life, and while she was reeking in perspiration, her mind was unclouded, and she answered questions quite coherently, the only alteration in her physical condition being that of peevishness and waywardness, a statement fittingly described as "hysterical." Another point worthy of allusion is that the pulse and the respiration never altered, the ratio being 4·5 to 1, corresponding with the normal pulse-respiration ratio. This is of diagnostic import, for, in the ordinary pyrexial condition, in which the rise of temperature is persistent, the pulse and the respiration also increase synchronously.

The conclusion, therefore, in the contemplation of the case, is, that in the absence of pericarditis, endocarditis, or other inflammation, the hyperpyrexial condition was the consequence

of an influence derived from the vaso-motor nervous system, or a neurosis, and that the many and characteristic manifestations of hysterical state very fittingly indicate that the designation of hysterical neurosis is the most appropriate epithet to apply to the case.

For the very complete and extended thermometric record I am indebted to Dr. J. D. Dixon, the senior house-surgeon, and Mr. W. H. Davis, the clinical clerk. For the notes of the case I have further to express my obligation to Mr. W. H. Davis.—*Lancet, April* 24, 1880, *p.* 641.

5.—A CASE OF HYPERPYREXIA.

A young woman, aged twenty-three years, was admitted to the Adelaide Hospital, Dublin, some ten or twelve days ago, under the care of Dr. James Little, suffering from cerebro-spinal symptoms, probably attributable to a fall on the back of the head a few days previously. At first the recorded temperatures presented no peculiarity, but at the end of last week the variations of temperature became remarkable for their extent and suddenness. At 9 p.m. on Monday, April 19, the axillary temperature recorded by a certified registering thermometer was 115° Fahr. A rapid but partial defervescence followed, but at 5 a.m. of the 20th the thermometer had again risen to the same astonishing figure. A few hours later it fell to 99·4°. The bursts of hyperpyrexia are ushered in by severe pain in the head, and pass away with profuse diaphoresis. This remarkable case will no doubt be recorded in detail by Dr. Little when it has terminated—we hope, in the patient's recovery.

[In the next number of the journal the editor says:—"Since our former note the temperature has repeatedly risen to more extraordinary heights even than those then reported. On Monday evening, April 26, a maximum of 125·5° Fahr. was recorded. This marvellous temperature is probably unique in the annals of clinical medicine. Meanwhile the patient lives and does well."]—*Medical Times and Gazette, April* 24, *and May* 1, 1880, *pp.* 457, 482.

6.—MICRO-ORGANISMS: THEIR RELATION TO DISEASE.

By Joseph Lister, Esq., F.R.S., Professor of Clinical Surgery in King's College, London.

The relation of micro-organisms to disease is a subject of vast extent and importance. If we compare the present state of knowledge regarding it with that of twenty years ago, we are astonished at the progress which has been made in the

interval. At that time, bacteria were little more than scientific curiosities; whether they were animal or vegetable, few people knew or cared; but most regarded them as animals on account of the active movements which they often exhibited. That they were causes of putrefaction, or other fermentative changes, was a thing not thought of; and the notion that they had special relations to disease would have been regarded as the wildest of speculations. Now, however, a mass of information has been accumulated regarding all these points, of which it would be hopeless for me to attempt to give even a brief sketch in the time at my disposal; and all that I can do is to present to the Pathological Section a few examples illustrating the progress which is being made in this department of research.

First, I will mention some examples of the labours of Dr. Koch, of Wollstein, in Germany. Though a hard-worked general practitioner, Koch has continued to devote an immense amount of time and energy to his investigations; and by a combination of well-planned experiments, ingenious methods of staining bacteria out of proportion to the tissues among which they lie, a beautiful adaptation of optical principles to render the coloured object discernible by the human eye, and further, by a most successful application of micro-photography, he has succeeded in demonstrating the presence of these minute organisms in a manner never before attained.

The *Bacillus anthracis* is now universally recognised among pathologists as the cause of splenic fever, so fatal among cattle in this and other countries, and capable of being communicated to various other animals, and, among the rest, to the human species, as has been lately illustrated by the so-called woolsorters' disease, in the North of England. The *Bacillus anthracis* is a large form of bacterium, as is shown at *a* in the accompanying woodcut [*vide* British Medical Journal]. It is there shown along with red blood-corpuscles of a mouse, and the rods of which it is composed are seen to be in diameter nearly one-fourth of that of the red corpuscles. Koch's method of staining the sections shows in the most beautiful manner that these bacilli are not only present in the spleen and some other organs, but that they people the blood in the minute vessels of all parts. Koch has thus added to our conviction that the bacillus is the cause of the symptoms, seeing that, as he remarks, it is impossible to suppose that an organism can develop in such enormous numbers at the expense of the vital fluid, without exerting a serious influence upon the system.

But the most striking and important results of Koch's method of investigation are those which relate to organisms

of much smaller dimensions. He found that, if putrid liquid is injected under the skin of a mouse, the animal may die in the course of a short time, as the result of the chemically toxic effects of the products of putrefaction absorbed into the circulation; but, if it survive this primary disorder, it may succumb in the course of about two days to blood-disease. If the point of a lancet be dipped into the blood of the heart of a mouse which has died in this way, and a scratch be made in the skin of a healthy mouse with the envenomed instrument, the second mouse dies with similar symptoms to those of the first, the poison being absolutely certain in its virulent operation; and the same thing may be continued indefinitely through any series of animals. If now sections be made, and stained, and examined by Koch's procedures, it is found that the entire blood of the diseased animal is peopled with bacteria, resembling those of the *Bacillus anthracis* in the enormous multitudes in which they are produced, and also in their rod-like form, but differing from them in being exquisitely minute and delicate, as is shown at *b*, drawn on the same scale as *a*, where it is seen that the diameter can only be represented by a slender streak not one-eighth of the diameter of the *Bacillus anthracis*, and such as, before the introduction of Koch's method, would have escaped notice altogether. Now, this disease is totally distinct from pyæmia, being not accompanied with multiple abscesses or embolism; and thus it has been shown by Koch that septicæmia may exist as a deadly blood-disease, caused by the development of micro-organisms, being equally distinct from pyæmia and from the chemically toxic effects of septic products.

On some occasions, as the result of the introduction of putrid fluid under the mouse's skin, Koch found, besides septicæmia, a local affection of the seat of inoculation, in the form of spreading gangrene; and, on investigating the part, he discovered in it, exactly corresponding with the extent of the local affection, another organism very differently formed from that of the septicæmia—viz., a micrococcus consisting of minute spherical granules arranged in linear series, like strings of exquisitely minute beads, as represented at *c* in the woodcut. Believing that this locally developing organism must be the cause of the gangrene, he tried to separate it from the bacillus of the septicæmia, and succeeded through an accidental observation of great interest. Having till that time employed the house-mouse in his experiments, he happened to try the inoculation of a field-mouse. This animal, though so closely allied, proved not susceptible of the septicæmia. The bacillus of that disease was unable to grow in the blood of the field-mouse, but the micrococcus of the gangrene could develop

among its tissues. The new organism was thus obtained in an isolated form, and, when now inoculated into the house-mouse, produced in that animal gangrene pure and simple, extending for an indefinite period among its tissues.

Thus the animal body, which had previously been an obscure field of labour in this department, in which the pathologists did little more than grope in the dark, was converted by Koch into a pure cultivating apparatus, in which the growth and effects of the micro-organisms of various infective diseases could be studied with the utmost simplicity and precision.

One more example I must take from Koch's work. On one occasion, as the result of inoculating putrid liquid into a rabbit, he observed a spreading inflammation having all the clinical character of erysipelas; and, on examining stained sections of the part, he discovered another exquisitely delicate bacillus resembling the micrococcus of the gangrene, in being local in its development, while its exact correspondence in extent with that of the disease led fairly to the conclusion that it constituted the *materies morbi*.

I will next refer to a disease occasioned by a micro-organism discovered by the eminent pathologist Professor Toussaint of Toulouse, whom I am proud to see present in this Section to-day. This disease has been somewhat inappropriately termed *Cholera des poules*, or fowl-cholera, for it is not attended with diarrhœa or any other of the symptoms of cholera; but, as it happened to be extremely destructive among the poultry-yards of Paris at the same time that an epidemic of cholera was raging in the city, the disorder that prevailed among the fowls was also given the name of cholera. The lesions by which it is chiefly characterised are great swelling of the chains of lymphatic glands in the vicinity of the trachea, pericarditis accompanied with great effusion, and congestion, and it may be ulceration, of the mucous membrane of the duodenum. It is a blood-disease, and highly infectious. If some of the blood of a chicken that has died of it be mixed with the oats with which healthy chickens are fed, a considerable proportion, perhaps four out of six, are affected and die; and similar results are produced by mixing the intestinal excreta of diseased fowls with the food. It is an interesting question how the virus thus administered enters the circulation. The invariable affection of the lymphatic glands of the throat suggests to M. Toussaint the idea that some accidental abrasion of the epithelium in the mouth or pharynx is probably the channel; and this view is confirmed by the fact that a similar affection of the lymphatic glands, together with other symptoms of the disease, is produced by inoculating the chicken in the mouth; and further, by the circumstance that

such chickens as fail to take the disease when fed with the infected food are liable to it when inoculated, implying that it was merely some accidental circumstance which secured their previous immunity. This disease has been made the subject of special investigation by M. Pasteur. He found that the micro-organism could be readily cultivated outside the body of the fowl. It was, indeed, somewhat particular as regards the fluid in which it would grow; thus yeast-water, in which the *Bacillus anthracis* grows readily, proved an unsuitable medium for this organism, but it grew luxuriantly in chicken-broth, and, indeed, in infusion of other kinds of meat; but chicken-broth proved peculiarly convenient for the purpose. M. Pasteur has been so kind as to send me some tubes in which the organism has been cultivated, and a drop of the liquid has been placed under a microscope on the table. It will be seen that the organism is a minute form of bacterium, oval-shaped, tending to multiplication by transverse constriction, and very frequently seen in pairs, and occasionally in chains. Its transverse diameter is from 1-50,000th to 1-25,000th of an inch; so that it resembles very closely the bacterium lactis (see *d* in the woodcut taken from a *camera lucida* sketch of the organism sent by M. Pasteur). So far as I am aware, this is the first time this bacterium has been shown in this country. Now, it was found by Pasteur that the organism could be produced in chicken-broth in any number of successive cultivations, and to the last retain its full virulence; so that, if a healthy chicken were inoculated with it, the fatal disease was produced as surely as by inoculation with the blood of a fowl that had died of the complaint. This was pretty conclusive evidence that the organism was the cause of the disease, and that it constituted the true infective element; because any other material that might be supposed to accompany it in the blood of the diseased animal must have been got rid of by the successive cultivations in chicken-broth.

The growth of the organism occasions no putrefaction in the liquid, so that this is a good example of a bacterium which is most destructive as a disease, but which is at the same time entirely destitute of septic property, in the primitive sense of that term as equivalent to putrefactive. After the bacterium has grown for a certain time in a given portion of chicken-broth, it ceases to develop further; and when this is the case, although the broth has lost only a very small proportion of its substance by weight, and although, as aforesaid, it has not undergone putrefaction, and still constitutes an excellent pabulum for ordinary forms of bacteria, the bacterium of the fowl-cholera, though introduced from some new source, is incapable

of growing in it. This fact certainly seems highly suggestive of an analogy with the effects of vaccination, or those of an attack of measles or scarlatina in securing immunity from the disease for the future. Here we have a certain medium invaded by a virus capable of self-multiplication, as is the case with those diseases in the animal body; the medium itself little affected chemically by the growth of the virus within it, nevertheless rendered unfit for the development of that virus for the future. But something more than the suggestion of analogy with vaccination has been effected by M. Pasteur. By cultivating this bacterium in a particular manner, which he has not yet published, he enfeebles the organism, as he believes, and produces such an alteration in it that, when inoculated into a healthy fowl, it produces only a modified and no longer fatal form of complaint, but the bird is thereby rendered secure against taking the ordinary form of the disease. It has been really vaccinated, if we adopt M. Pasteur's extension of the term vaccination to other similar cases; for just as we speak of an iron milestone, we may, if we please, apply the term vaccination to the use of a virus other than the vaccine obtained from a heifer. But though the vaccination with the modified bacteria and the fowl-cholera does not occasion the fatal disease, it produces pretty severe local effects. If inoculated on the breast of the fowl, it causes a limited gangrene of the pectoral muscle, the affected part falling off in due time as a dry slough. Through the great kindness of M. Pasteur, I have now the opportunity of showing to the Section a hen which has been treated in this way. You observe a slough on the breast of the bird, about as large as a penny piece; it is dry, and obviously old. The fowl has been some days in my possession subsequently to its journey from Paris; but though more than enough time has elapsed since the inoculation to have caused its death, had the disease been in the ordinary form, it is, you see, in good health, bright and active, and it both eats and sleeps well.

I will now return to the *Bacillus anthracis*, with regard to which I shall have again to refer to the labours of M. Toussaint. First, however, I must allude to the work of some of my own countrymen. In March 1878, an experiment was made at the Brown Institution, at the suggestion of Dr. Burdon Sanderson, of inoculating a calf with the blood of a guinea-pig which had died of splenic fever, which is exceedingly fatal to rodentia. The result was that the calf took the disease, but in a mild form, and recovered from it; and a similar fact was observed in two heifers treated in the same way.

This line of inquiry has since been followed up by Dr. Sanderson's successor at the Brown Institution, Dr. Greenfield,

with the view of ascertaining whether the milder form of the disease in cattle, resulting from inoculation with the blood of rodentia affected with it, confers upon the cattle immunity from the complaint in its fatal form; or, to use again M. Pasteur's expression, whether the cattle have been vaccinated with reference to anthrax. And I have great pleasure in being able to inform the Section, by Dr. Greenfield's permission, that the question has been answered in the affirmative; and that one bovine animal, inoculated seven months ago with virus from a rodent, has proved itself, on repeated inoculations, entirely incapable of contracting splenic fever, remaining free from either constitutional or local manifestations of it.

And now to return to M. Toussaint, who has made observations with regard to this same subject of vaccination against anthrax fraught with the very deepest interest. The question arises, with regard to effective vaccination, using the term in Pasteur's general sense: Is it essential that micro-organisms should develop in the blood of the animal in which immunity from further attacks of the disease is to be secured? or is it possible that the necessary influence upon the system may be exerted by merely chemical products of the growth of that organism in some other medium? With the view of approaching the solution of this question, M. Toussaint has performed experiments of injecting into the blood of healthy sheep blood taken from an animal affected with splenic fever, but deprived of the *Bacillus anthracis*. Taking blood from a sheep just on the point of death, when the bacillus has presumably produced all its possible effect on the vital fluid, M. Toussaint proceeds to deprive it of the living bacillus in either of two ways—by filtration, or by destroying the vitality of the organism. The former he effects by mixing the blood with three or four parts of water, and then passing it through about twelve layers of ordinary filter-paper. The bacillus, in consequence of its large dimensions, is entirely retained by this form of filter, as is proved by the fact that the filtrate no longer gives rise to the organism in a cultivating liquid or in a living animal. Nevertheless, if injected in considerable quantity into the circulation of a healthy sheep, it produces a true vaccinating influence; that is to say, secures immunity from splenic fever. But, what is further extremely interesting, in order that this change in the constitution of the sheep may be brought about, the lapse of a certain time is essential. If a vaccinated sheep be inoculated with anthrax within a few days of the operation, it will die of splenic fever; but if from twelve to fifteen days be allowed to elapse, complete immunity is found to have been produced. Similar results followed from the injection of anthrax blood treated by M. Toussaint's other method, which

consists of maintaining it for a considerable time at a temperature of 55° Cent. (131° Fahr.), which has the effect of killing the bacillus; after which half per cent. of carbolic acid is added, to prevent putrefaction of the liquid. The blood treated in this way having been proved to be free from living bacilli by negative results of an experiment upon a rodent, about four cubic *centimètres* are injected into the venous system of a sheep, with the effect of producing the same protective influence against splenic fever as is ensured by the filtered blood. These experiments are still in progress; but M. Toussaint informs me that he has already ascertained the existence of immunity against anthrax for three months and a half in both sheep and dogs treated in this way.

I need hardly remark on the surpassing importance of researches such as these. No one can say but that, if the British Medical Association should meet at Cambridge again ten years hence, some one may be able to record the discovery of the appropriate vaccine for measles, scarlet fever, and other acute specific diseases in the human subject. But even should nothing more be effected than what seems to be already on the point of attainment, the means of securing poultry from death by fowl-cholera, and cattle from the terribly destructive splenic fever, it must be admitted that we have an instance of a most valuable result from the much-reviled vivisection.

I have yet one more example to give of researches in this domain of pathology; and this also has reference to the *Bacillus anthracis*. The investigator in this instance is Dr. Buchner, assistant physician in Munich. It is well known that the bacillus anthracis is morphologically identical with an organism frequently met with in infusion of hay, which may be termed hay-bacillus. Such being the case, it occurred to Dr. Buchner that they might be merely one and the same organism modified by circumstances. For my own part, I am quite prepared to hear of such modifying influence being exerted upon bacteria, having made the observation several years ago that, when the *bacterium lactis* had been cultivated for some time in unboiled urine, it proved but a feeble lactic ferment when introduced again into milk. Its power of producing the lactic fermentation had been impaired by residence in the new medium. In the case before us, indeed, the physiological difference between the two organisms seems, at first sight, so great, as to forbid the idea of anything other than a specific difference. The bacillus anthracis refuses to grow in hay-infusion in which the hay-bacillus thrives with the utmost luxuriance; and conversely, the hay-bacillus is utterly incapable of growing in the blood of a living animal, whether introduced in small or in large quantities. The hay-bacillus is

remarkable for its power of resistance to high temperatures, which is not the case with the bacillus anthracis. The latter is destroyed by a very slight acidity of the liquid of cultivation, or by any considerable degree of alkalinity, whereas the former survives under such conditions. Both will grow in diluted extract of meat, but their mode of growth differs greatly. The hay-bacillus multiplies rapidly, and forms a dry and wrinkled skin upon the surface, while the bacillus anthracis produces a delicate cloud at the bottom of the vessel, increasing slowly. Nothing daunted by these apparent essential differences, Dr. Buchner has laboured with indomitable perseverance by means of experiments carried on in Professor Nägeli's laboratory, to solve the double problem of changing the bacillus anthracis into hay-bacillus, and the converse. Having devised an ingenious apparatus by which a large reservoir of pure cultivating liquid was placed in communication with a cultivating vessel, so that any cultivation could be drawn off by simply turning a stop-cock, and further cultivating liquid supplied to the organisms remaining in the vessel by a mere inclination of the apparatus, Buchner proceeded to cultivate the isolated bacillus anthracis in extract of meat for several hundred successive generations. As an early result of these experiments, he found that the bacillus lost its power of producing disease in an animal inoculated with it. Up to this point he is confirmed by Dr. Greenfield, who has found that, when the bacillus anthracis is cultivated in aqueous humour, after about six generations it loses its infective property. Then as Buchner's experiments proceeded, the appearance of the growing organism was found to undergo gradual modification. Instead of the cloud at the bottom of the vessel, a scum began to make its appearance—at first greasy-looking and easily broken up—constituting, so far as appearances went, an intermediate form between the two organisms; and in course of time the scum became dryer and firmer, and at length the modified bacillus anthracis was found to be capable of growing in an acid hay infusion, and to present in every respect the characters of the hay-bacillus. The converse feat of changing the hay-bacillus into the bacillus anthracis proved very much more difficult. A great number of ingenious devices were adopted by Buchner, who was, nevertheless, continually baffled, till at last he attained success in the following manner. Having obtained the blood of a healthy animal under antiseptic precautions, and defibrinated it also antiseptically, and having arranged his apparatus so that the pure defibrinated blood, which was to be the cultivating medium, should be kept in constant movement, so as to continually break up the scum, and also keep the red corpuscles in perpetual motion so as to convey oxygen to all parts of the

liquid—in this way imitating, to a certain extent, the conditions of growth of the bacillus anthracis outside the animal body, within which the hay-bacillus could not be got by any means to develop—he proceeded to cultivate through numerous successive generations. A transitional form soon made its appearance; but the change advanced only to a limited degree, so that further progress by this method became hopeless. The modified form hitherto obtained failed entirely to grow when injected into the blood of an animal. On the contrary, it was in a short time completely eliminated from the system, just like the ordinary hay-bacillus. It had, however, been observed by Buchner that spores had never been formed by the bacillus growing in the defibrinated blood; and it occurred to him that, perhaps, if it were transferred to extract of meat, and induced to form spores there, the modified organism might yet grow in the blood of a living animal. The carrying out of this idea was crowned with success; and, both in the mouse and in the rabbit, Buchner succeeded by injecting various different quantities containing the organism in different animals. When large quantities were introduced, the animals died rapidly from the merely chemical toxic effects of the injected liquid; but, in some instances, after the period of these primary effects had passed, a fatal disease supervened—attended, as in anthrax, with great swelling of the spleen, the blood of which was found peopled as in that affection with newly formed bacilli; and the spleens affected in this way were found to communicate anthrax to healthy animals just like those of animals which had died of ordinary splenic fever.

Supposing these results to be trustworthy, and the record of them bears all the stamp of authenticity, I need scarcely point out to a meeting like the present their transcendent importance as bearing upon the origin of infective diseases, and their modifications as exhibited in epidemics.

I trust that these examples may suffice to convey some idea of the work now going on with reference to the relations of micro-organisms to disease.—*British Medical Journal, Sept.* 4, 1880, *p.* 363.

7.—NOTES ON CHIAN TURPENTINE AND ITS USE IN CANCER.

By Professor JOHN CLAY, Obstetric Surgeon to the Queen's Hospital, Birmingham.

It is a matter for regret that the supply of the genuine Chian turpentine has been so limited, as this has led to the substitution of factitious drugs, the use of which, as I have previously explained, unfavourably influences the results, besides entailing

the further disadvantage of preventing a thorough testing of this method of treating cancer. I believe it is a fact that Chian turpentine, in mass, can scarcely be procured in this country at the present time, and therefore it is obvious that the treatment of the disease must be somewhat in abeyance until a supply of the pure drug arrives from abroad. I hope that the difficulty will soon be overcome, as I have been making special efforts to obtain the pure turpentine direct from Scio, and have had three excellent samples of the genuine drug sent to me through the post from that island; a supply may therefore be expected shortly, when the purity of the drug at least will be definitely determined. The specimens referred to differ in some particulars from the Chian turpentine which I have previously described, and which had been in stock some years. There are also samples of larch turpentine in the market, which slightly resemble the recently gathered genuine drug. It may be of advantage therefore to the profession to describe each, and to note their differences.

Specimen No. 1 is of a pale, amber colour, and almost entirely free from impurities. It has the fragrant odour peculiar to Chian turpentine well-marked, which is readily perceptible after rubbing a small portion between the thumb and finger. It has a mild terebinthinate taste, which rapidly disappears. On placing a small portion of the drug on a piece of glass, and exposing it to the atmosphere, it considerably thickens after a few days' exposure.

Specimen No. 2. This, obtained last year, is the drug as collected. It contains a large quantity of foreign matter, such as pieces of bark, sand, &c., all of which give it a darker colour than the last-mentioned specimen. Two ounces of this crude product yielded, after straining, upwards of half an ounce of impurities. The strained portion contained still a quantity of minute particles of foreign substances. The taste and odour are the same as in the Specimen No. 1.

Specimen No. 3 resembles soft glazier's putty, but is somewhat whiter, and is of the same consistence. It is Chian turpentine that has been well washed in water, to free it from impurities. It has a mild taste of turpentine, and the peculiar odour is well-marked. If a portion is subjected to pressure between two pieces of glass, water can be readily forced out of the mass.

Three specimens have been submitted to me as genuine Chian which were purely larch turpentine. They may, as alleged, have been gathered in Cyprus. They have a strong odour of pine wood, and are of a browner appearance than the recent specimens just described. On tasting a portion, it appears tasteless for the first minute, after which a strong, bitter, nauseous flavour became manifest, eventually leaving a strong,

sickening sensation at the back of the throat, which is slow to disappear. A portion placed on glass, and exposed to the atmosphere for four weeks, showed no signs of thickening, and readily adhered to the fingers.

The degree of solubility of the two kinds of turpentine, in ether and alcohol, is not materially different from that described in a former paper. The mild terebinthinate taste of the pure drug, its peculiar odour, with its power to solidify on exposure to the atmosphere, are characters sufficient to distinguish it from any other turpentine resin.

It is plain that sufficient time has not been allowed to elapse for the full effects of the remedy to be manifested, as in several instances of condemnation it has almost invariably been declared inoperative after a few weeks' trial only. Besides the unsatisfactory results which have accrued from the use of the impure drug, the full effects of the pure turpentine have not been gained in some instances from the drug not having been entirely digested. This has arisen occasionally from its incomplete preparation for administration. In compounding the mixture, freshly-prepared mucilage of tragacanth, B.P., has not been used, and then it rapidly decomposes; or sufficient of the mucilage has not been employed, which causes the resin to separate, and the doses of the medicine, therefore, have been irregular and insufficient. It has been shown in the Pharmaceutical Journal that acacia powder might be advantageously substituted for the tragacanth. It is necessary, therefore, to provide that a sufficient quantity of either gum shall be used in the preparation of the Chio turpentine mixture. Where the digestive powers are impaired, an addition of twenty minims of the compound tincture of cinchona to each dose has occasionally proved beneficial. The discontinuance of the sulphur has been advised, in order to make the mixture more elegant and miscible. I believe, however, that the mixture is more efficient, when it is well tolerated, if prepared with the sulphur.

In reference to the pills, if they are not properly prepared they are not always digested. If this is discovered on examining the evacuations, the use of the mixture in conjunction with the pills is indicated; that is, a dose of the mixture should be taken by the patient night and morning, and two pills in the middle of the day, in each case after food. It is advisable, when commencing the treatment, to give only half doses of the turpentine for the first week. Magnesia should not be used as an excipient in the preparation of the pills, but whether this exception ought to apply to the recently collected drug future experiment will have to decide. Pills prepared with magnesia are almost insoluble, and the same remark applies to some coated ones. The pills may be prepared sometimes with ether,

to soften the turpentine, or it may be made soft by immersing the mortar in a hot-water bath, the sulphur being added to the mass in its softened state. The latter mode appears preferable, if only to facilitate the digestion of the pills, as if any difficulty is met with in this way they may be roughly powdered and taken in milk or some bland liquid, and then they are generally digested.

The statements made in my original paper as to the efficacy of Chian turpentine in cancer appear to me to be fully confirmed by the additional experience gained in the use of the remedy. In the cases previously reported the cancer has disappeared, and there are no signs of its return. This fact must be considered at least as a complete refutation of the statements, recently and boldly made, that Chian turpentine in the treatment of cancer is useless. The cases just referred to are unique of their kind, for, so far as I know, they are the only instances on record of cancer being cured solely by the administration of an internal remedy. I feel justified, therefore, in stating that uterine cancer at least may be removed by the use of Chian turpentine.

It is a fact which might be expected that most of the cases of cancer which have presented themselves are in an advanced stage of the disease; and more especially is this the case in cancers of the uterus. Yet the treatment continues to be very efficient. My experience does not stand alone in this respect, for several gentlemen have given independent testimony of the good effects produced by the turpentine treatment in cancer of various organs. In my original experiments the turpentine alone was used in order to thoroughly test its efficacy, but it now appears that the use of certain local and general measures undoubtedly promotes the convalescence of the patient. It is possible, therefore, to formulate a line of treatment which shall be successful in cancers of the uterus. Hence, given a case of cancer limited to that organ, and a steady use of the remedy for six or eight months, continued with certain general and local remedies if necessary, and a disappearance of the cancer may be reasonably expected. Eleven cases of uterine cancer under this treatment at the Queen's Hospital, besides a number of others in private practice, so far justify the preceding statements. Some very interesting facts have been observed during their treatment, which I hope to detail on a future occasion.

It is advisable not to be too precipitate in rejecting a case of uterine cancer on the ground of its being too far advanced for treatment. The following case, amongst others, is to the point. Mary B. took her discharge from the Middlesex Hospital, London, about four months ago, and, according to report, was informed that her case was incurable, and that she had not long

to live. She had heard of the turpentine treatment, and was very anxious to be under my care at the Queen's Hospital, but I advised her not to undertake the journey, as I believed the case, from what I heard of it, was too far advanced for treatment. This advice, however, she disregarded, and became an in-patient at the Queen's Hospital. Here she was placed under the Chian turpentine treatment, and improved so much in nine weeks that she is about to return to London with every prospect of soon being cured.

The mode in which Chian turpentine effects the removal of cancer was well illustrated in a case of epithelioma of the vulva. The patient, aged sixty, had been operated upon for cancer of the clitoris or vulva. The case was reported in the Lancet at the time. The patient thoroughly recovered from the operation. About a year afterwards cancer reappeared in the lower part of the vulva and vagina. The growth was again excised, and she made a good recovery this time. About eight months afterwards a cancer appeared on the right labium, and when it was there seen for the first time it was the size of half-a-crown. It was determined to give the Chian turpentine, and the drug was given in full doses three times daily. At the end of the first week there was no alteration, excepting that the cancer was thought to be somewhat paler on its surface, and the surrounding swelling less. Second week: The growth was coated with a secretion of a greyish colour, which appeared to be firmly adherent. Fourth week: The growth was only half its former size. Its surface was somewhat convex; and was considerably thicker than previously, and was surrounded by a ring of a bright crimson colour. One of the resident surgeons of the hospital who saw it remarked that it looked like a small mushroom springing from the vulva. Sixth week: The growth was now diminished to the size of a fourpenny piece, and was still surrounded by the bright coloured ring, but was free from the secretion. The surface did not bleed on being touched. Eighth week: The coloured ring had disappeared. The growth was much smaller, and it had the appearance of a large "seedy" wart, such as is sometimes seen on the hands. Tenth week: The growth remained about the same. Twelfth week: The growth had all but disappeared, and the patient went into the country for a short time, but promised to report herself when she returned.

In private practice three cases of cancer of the rectum are under treatment, two of which are much improved; and one has not been seen again, but a favourable report is given after seven weeks' trial. Three cases of cancer of the stomach are under treatment; one has discharged herself, but the other two have remarkably improved, as regards freedom from pain

and capacity of retaining nourishment, though continual sickness existed previously. So far as the treatment has extended, these cases seem to prove that the turpentine is equally, if not more, efficient in cancer of the stomach than of any other organ. In one case the glands of the neck were much enlarged; but these swellings entirely disappeared after the use of the remedy. Four cases of cancer of the tongue have been under observation. In one case the growth was as large as a cherry, and in four weeks it was reduced to a level with the mucous membrane, and it appears now to be cicatrising.

Several cases of cancer of the face have been very much benefited. In two cases of endothelial cancer of the abdomen and one of cancer of the liver, no benefit seemed to be derived, excepting that in one case there was some alleviation of pain, and an improvement of general health for a time.

In all forms of cancer, where the turpentine has been taken for six or eight weeks, I have found the administration of a tonic to be of advantage, as it promotes the convalescence of the patient, and if the disease affects the uterus or rectum it seems to facilitate the escape of the débris from the destroyed mass, and to promote cicatrisation. Four minims of the tincture of perchloride of iron, and three minims of liquor strychniæ, taken three times daily, are recommended; and if there be any pain, which often happens after six months' use of the remedy, six drops of tincture of belladonna are added. A generous diet is allowed. Morphia is not advised. The bowels should be kept daily moved, when necessary, by a mild aperient. After the turpentine has been regularly taken for three or four months, I now recommend it to be discontinued for three or four days in the fortnight. It is probable that future experience will show that, after it has been taken for the above-named period, it will be no longer necessary in the majority of cases, but as a precautionary measure it has been generally continued in the manner just described.

There are sixteen cases of cancer of the breast under treatment in the hospital, and a large number are under observation privately. The effects of the remedy in the first few weeks are, the relief of pain, and a diminution in the size of the breast, which is generally more movable, even when apparently fixed to the walls of the chest; this probably arises from a diminution of the surrounding cancerous infiltration. Time has not been sufficient, however, to speak with definiteness as to the ultimate results. The clinical facts brought out in this class of cases are very interesting and instructive. There is a great probability that the disease is arrested, as after four months' trial of the remedy the morbid growth has not increased in size. As far as can be stated at present, for therapeutical purposes the cases

appear to be divisible into three classes:—1. The ordinary scirrhus of the breast, with or without surrounding infiltration. 2. Epithelial cancer. 3. Cases of ulceration after previous operation.

In the *first* class of cases great interest attaches to the experiment, as indicating how the solid mass is removed. It appears at present to deport itself as if it were a foreign body, and seems disposed to make its way rapidly to the surface; but in the cases where this has occurred the growth is not of an active character, for as the mass comes to the surface a crust forms upon it. This disappears in time, and another forms, while the whole bulk of the mass gradually diminishes in size. It may prove eventually that this is one mode of the removal of the disease. In these cases the growth does not increase in size, but, on the contrary, gradually diminishes.

In the *second* class—i. e., epithelial cancers—the surface of the growth becomes paler at first, then smoother, as if it had been levelled by friction; sometimes some of the nodules slough away. Then a process of cicatrisation takes place. There are two cases in which the new tissue around the growth is quite half an inch in breath. Two others, about one and a half and two inches respectively in diameter, have entirely healed over.

In the *third* class of cases the results are so far favourable that the ulceration has not increased in size, but they have not progressed so favourably as the other cases. In several instances the glands of the axilla have been enlarged, but the enlargement has generally disappeared under a steady use of the turpentine.

The importance of these imperfect notes to the profession, and the influence they may have in aiding the treatment of cancer will, I hope, be a sufficient apology for reverting to the subject. At least I trust I have shown that the remedy is not useless. I may, in conclusion, state that in the treatment of these diseases patience and perseverance for a few months are absolutely necessary. In some diseases which affect the human race, a continued treatment for twelve or eighteen months is often thought requisite. It has, I believe, been here shown that the remedy does produce some influence on the progress of cancer; and it is but reasonable to require that a similar indulgence be extended to the treatment of cancer by this method, as in the chronic diseases just referred to. As the remedy can be taken with impunity for a long period, and if time be granted for the trial of it, I feel that I am justified in stating that its steady use promises excellent future results.—*Lancet*, *Oct.* 2, 1880, *p.* 533.

8.—CHIAN TURPENTINE IN CANCER OF THE BREAST.

By Dr. JOHN GILL, Surgeon to Stratford-on-Avon Infirmary.

On March 29th last I commenced the treatment of an ulcerated cancer of the breast with Chian turpentine in solution, the drug I used corresponding closely with Professor Clay's description of the pure kind.

After about twenty doses the patient was relieved from the lancinating pains which she had endured for many months, and these have not returned, though she sometimes complains of aching about the lower margin of the sore. The discharge, at first very profuse, is much diminished. When the case came into my hands, March 28th, the infiltration was threatening the axillary glands, but it certainly has been arrested in that direction, for they are perfectly free from disease, and the lines of tenderness and hardness which could be traced towards the axilla are no longer perceptible. The ulcer is considerably smaller than it was; the cancerous mass appears to be disintegrating and sloughing out from the centre, while along the upper border there is a firm cicatrix. The general health is decidedly improved, and the patient usually sleeps well. The only external applications have been Condy's fluid or sanitas, with occasionally a little tincture of opium to allay superficial smarting.

I should not have sought to publish this case at present, as it is too incomplete to justify any very definite conclusions, but I think there would be cause for regret if the instances of failure recorded in the Lancet should dishearten any who are trying a remedy with which Professor Clay has achieved such gratifying results, and I therefore offer my experience, as far as it goes, hoping that it may be accepted for as much as it is worth in support of a prolonged and thorough test.—*Lancet, July* 24, 1880, *p.* 152.

9.—CHIAN TURPENTINE IN CANCER OF THE UTERUS.

By J. E. KENYON, L.R.C.P. Lond., Bradford.

[The following remarks are based upon a case in which Chian turpentine was given strictly according to Dr. Clay's instructions.]

The patient commenced to take the pills on March 29th last, when there were all the usual local signs of advanced cancer, minus a fetid discharge per vaginam. A strong hard mass extending over the whole uterine structure, but more especially infiltrating the posterior wall, and projecting thence almost through the os. Paroxysms of pain coming on so severe that large doses of morphia were necessary to relieve them. The

appetite not only gone, but the stomach refused to take almost any food. The cancerous cachexia very evident, and the patient's spirits very much depressed, and floodings much and often. Now, on examination per vaginam there is still a considerable tumour to be felt, but it is comparatively very soft and yielding to the touch, and not by any means so extensive; there is little or no hemorrhage; pain by no means so severe as formerly, and almost entirely confined to the thigh and leg of the left side. The appetite is excellent, and the cancerous colour of the skin and complexion almost gone. The patient expresses herself as feeling *very* much better in every way, and is in the habit of attending to household duties and taking out-door exercise as when in her wonted state of health.

The disease in this case was first discovered on Nov. 26th last, when the tumour was situated on the posterior wall of the uterus, and only then of about the size of a walnut. There has hitherto been no disturbance of the functions of rectum or bladder, except a tendency to constipation. The disease made rapid progress until the turpentine pills were taken, and since the first day of her taking them, March 29th, so far from progressing the mischief appears to have stopped.

I may add that the glands of the neck are enlarged, and have been during the last four or five months. When painful, extract of belladonna locally applied has always relieved the pain.—*Lancet, July* 10, 1880, *p.* 57.

10.—CHIAN TURPENTINE IN CANCER.

By Dr. Richard Drury, Birmingham.

Just at present, while the administration of Chian turpentine is being advanced as a remedy for cancer, it seems only right to bring forward some evidence in its favour, and that, too, when its merits are being prejudiced, for the remedy as yet has not had a fair time of trial. The great difficulty in procuring the drug, and the substitution of a spurious article for it, are most likely to bring discredit on the remedy.

The following case which has come under my observation is worthy of record, and is one of great interest, as it bears directly on the subject in question.

A lady, aged forty-seven, of full habit, came under my care some months ago, suffering from symptoms that plainly told she was the victim of malignant disease of the womb. As no hope was given, it was thought advisable to see some specialist, and one of repute was accordingly called in; but the case was one that admitted of no doubt, and an opinion to this effect was expressed a second time,—"There was nothing to be done

but to soothe, to give morphia, to the end." Just about this time there was some mention made of the recent discovery of Professor Clay, and it was resolved to give his remedy a trial. The patient was then seen by him, now nearly ten weeks ago, and the Chian turpentine administered. After a little disappointment signs of improvement commenced to show themselves, and the result so far is most gratifying. Here, then, was a case of a most fatal kind, as to the nature of which there was no shadow of doubt. Under the influence of the true Chian turpentine this tumour, which was of a very formidable size, is now gradually diminishing—"melting away," as described by Professor Clay, and the structure, which was formerly hard, that peculiar stony hardness *sui generis*, has now become softer, more resilient; in fact, more like uterine tissue.

[Dr. J. STEWART, of West Hartlepool, writes:]

I have for some weeks been treating two cases of carcinoma uteri with Chian turpentine: in one case the pain has been neither so severe nor constant as formerly, but in neither case can I discover any arrest in the progress of the disease. The Chian turpentine I have been using was from the stock of a most respectable chemist, who assures me he has had it in his possession many years. It is only right to add that I submitted a sample to Professor Clay, which he pronounced to be spurious.—*Lancet, July* 3, 1880, *p.* 33.

11.—ON PYÆMIA, OR NON-SPECIFIC BLOOD POISONING.

By JOSEPH DUGGAN, L.K.Q.C.P.I., Turloughmore, Galway.

Pyæmia, or purulent blood-poisoning, has been shown by recent observers to be an affection not produced by pus mingling with the blood, nor does it cause inflammation of the veins; it is therefore a misnomer—the name ichoræmia, or what is better, septicæmia, is, I think, the most appropriate term for this affection; numerous microscopic examinations of pyæmic blood and pyæmic deposits failed to discover scarcely any pus. Before a purulent wound, sore, or ulcerating surface assumes the pyæmic phase, their entire morbid structure and composition are, I may say, completely changed. What was laudable pus bathing healthy granulations, may perhaps, after the lapse of a few hours, have its secreting surface and secretions wholly and chemically altered into a sort of ichorous sanies of unhealthy character and odour; in a wound the lips are opened, everted, and dry, the bottom of the wound, which was covered with healthy granulations and creamy pus, becomes an ash-coloured slough, from which runs a thin acrid ichor of a very fœtid smell.

The patient's general appearance is very much changed to one of sickly yellow or earthy colour, combined with a depressed and anxious countenance, &c., frequent pulse, vomiting, and prolonged shiverings or rigors without feeling cold, alternated with copious perspirations, &c.; but the pathology of this blood-poisoning is so well known to every medical man it is needless for me to discourse on that wide and extremely interesting division of its history, yet there are a few points, *sub judice*, not yet fully decided which are open to discussion. How is it the system gets diseased or poisoned in this affection? And how and by what means is it developed?

At one time it was the generally received opinion that the pus was absorbed and carried by the veins from the primary purulent centre into the general system, to be deposited here and there, according to some unascertainable elective affinity. Arnott stated it was due to inflammation extending along the internal surface of the veins, the formation of pus in their cavities, and from thence carried to the general circulation; but it was left to our great scientist Virchow to explain the real cause and nature of those pyæmic deposits; from his numerous and accurate experiments and scientific deductions he tells us distinctly that the puriform fluid found in pyæmic deposits is not pus, but disintegrated clot.

And if there are diseased conditions of the veins besides, it is not the cause but the consequence of the clot within; thus he upset the old theory and that of Sedillot *in toto*, proving to a demonstration that those secondary diseased deposits originated from emboli, produced from disintegration of fibrine, and the crumbling away of the thrombi occupying the diseased veins of the primary centre of the disease, and also in certain cases the absorption of ichorous and septic fluids play an important *role* in the dissemination of this disease.

Dr. Bristowe, in his admirable essay, sums up in believing that thrombosis alone is the more general explanation of the obstruction of the minute vessels which tend to secondary deposits.

That great pathologist Virchow has, without cavil, unquestionably explained this morbid phenomenon satisfactorily, and may be regarded as the approved one of the present day. Yet I believe (with all possible respect and diffidence) there is a something that must precede, some other morbid course that acts prior to the disintegration of fibrinous clot, an agent endowed with a catalyctic force or power that causes this breaking up of fibrinous structures at the primary seat of purulent diseased foci.

Our great poetical pathologist, the illustrious and immortal bard of Avon, truly describes this venomous touch, that

"With a sudden vigour it doth curd and posset,
Like eger-droppings into milk,
The thin and wholesome blood."

Some time ago I was afforded an opportunity of obtaining some fluid taken from a diseased deposit in a pyæmic patient, and had it placed in the field of a microscope of rather high power. I observed in the fluid a number of ill-defined globules and granular matter, with myriads of bacteria and vibriones moving rapidly hither and thither. In order to further satisfy myself, I submitted more of the same fluid on the field of the microscope, and found the same appearance of the fluid as in the first observation; this led me to infer that those morbid organisms, or some fibrine ferment, were the principal agents in the breaking up of the healthy fibrinous deposits that ultimately formed those emboli, and hence those septic deposits that spread throughout the general system, their numbers increasing according to the amount of venous distribution, which are, on this account, more frequently found in the thoracic and abdominal viscera.

That this pyæmia or septicæmia can occur within the system, without external morbid causes, seems doubtful; it is a non-specific blood poison produced by infection, contagion, or some morbid agency, as septic organisms or fibrine ferment, acting on surfaces of broken continuity, such as wounds, sores, ulcerations, raw surfaces, fractures, &c., and also on the freshly evacuated uterus.

With reference to surgical and puerperal septicæmia, it cannot be denied that in ninety-nine cases out of a hundred the poison comes by infection or contagion. In the surgical wards of an hospital the traumatic atmosphere frequently induces this affection, and surely if erysipelas is in the same apartment the same holds good in the puerperal state; the parturient atmosphere particularly, if any way unhealthy or poisoned by the toxic germs from erysipelas, will very probably bring on this fatal affection. It is, therefore, absolutely necessary that all medical and surgical attendants, accoucheurs, dressers, nurses, attending such cases should have themselves well disinfected and absent themselves for a time from attending surgical and midwifery cases, &c.; the use of sponges, instruments, and appliances previously infected, should be most religiously cleaned and purified. As for sponges, and dressings, &c., they should be destroyed, and all the wards or apartments placed under the most exact disinfection and thorough cleansing.

Wounds brought in contact with those diseased germs floating in such a poisoned atmosphere, and suddenly changed from

a healthy to an unhealthy appearance, the edges are everted and dry, the surface covered with an unhealthy ash-coloured slough mixed with a kind of purulent sanious coagulable lymph, and healthy fibrinous structures soften and break up; the nervous filaments in immediate proximity have their terminal branches bathed in this cachectic or ichorous fluid, and convey by their different branches those morbid impressions to the nervous centres, and hence we see the sudden change in the whole aspect of the patient, the severe and repeated shiverings alternated by copious perspirations; the earthy yellow appearance of the skin, which feels clammy, frequent diarrhœa, the hollow voice, with weak and frequent pulse, followed by nocturnal delirium, all these symptoms showing how powerfully the poison has acted on the nervous system assuming a sort of a dynamic fever, pleuritis, pericarditis or peritonitis; they ultimately set in with obstinate vomiting; the patient finally sinks.

The same morbid phenomena occur to those infected after child-birth, the natural secretions are arrested, the parts become hot and dry; secretions thin, scanty, ichorous, and of a fœtid scent; pulse frequent; abdomen tender and painful; with constant vomiting, and repeated attacks of shivering and sweating; one or more of the serous cavities are attacked, hence we invariably see peritonitis, or pleurisy, &c.; the countenance, sunken, anxious, and desponding, is marked with a lurid redness of the malar eminences. All these symptoms combined with ichorous secundines, forebode to the educated accoucheur the arrival of that most terrible and destroying malady, puerperal septicæmia.

Preventive medicine and hygiene have of late years done much towards arresting the spread of contagious and infectious diseases; stayed the havoc which they heretofore perpetrated on man and animals; diminished to a very great extent the mortality from those diseases, and spread those wholesome doctrines of cleanliness and sanitation as the cardinal means of preserving health and checking epidemics. Medical science and experience are showing daily to the general public the great benefit and absolute necessity for the adoption of this sanitary reform.

With reference to this blood poison now under consideration, cleanliness *par excellence* and thorough disinfection are very important remedies in arresting and controlling the spread of this poison, combined with the application and use of those antiseptic remedies and appliances its septic action on the system is neutralised or destroyed. As to the doctrines and researches of Pasteur, or of those who are opposed to him, I shall not here dilate, it would exceed the limits of my

paper. The propagation of sporadic diseases is plainly due to vital organisms and their spores floating in the atmosphere; whether they are *sui generis* the essence of infection, or carriers of it, I know not, and can only answer, ignoramus.

When there is a dread of this infection it is scarcely necessary to observe the great necessity of perfect disinfection and the immediate use of antiseptic remedies in midwifery practice. This precaution is not adopted as frequently as it should be, or else we should not have such mortality after child-birth. Midwifery instruments, catheters, should be always washed and cleansed with carbolised solutions; and carbolised solutions of weak strength frequently injected into the vagina will be found to control septic action very much. Washing all utensils and napkins in like solution will also purify the lying-in chambers very much, and contribute to her comfort and safety.

The same preventive treatment is also applicable in wounds and surgical cases; besides a free and very diluted current of sulphurous acid gas should be constantly diffused through the wards. With reference to the antiseptic treatment of wounds, I deplore the diversity of opinion that exists, and the fallacious reasoning set forth against it. Some surgeons state that ordinary cleanliness and water dressing are just as successful as those who adopt the antiseptic treatment; but by far the probability of *immunity* is in favour of Listerism, it is there to prevent the occurrence of pyæmia or septicæmia, and also to keep wounds fresh, pure, and untainted. Not so with the other system: it is devoid of protective power. The antiseptic treatment of wounds as adopted by Prof. Lister may be ranked as a great achievement in modern surgery, and an honour to the genius of her son, Lister.

In pyæmia or septicæmia very few remedial agents can be found of much benefit. The hyposulphides, indeed, are rational remedies; they were found most successful in the practice of Prof. Polli, of Milan, who first made known their efficacy, and in every case I think their use would be beneficial.

In the treatment of specific blood-poisoning, such as small-pox, I used solutions of sulphurous acid in mixture with marked benefit; also permanganate of potash, chlorate of potash in bark, with like results; but none of those remedies succeeded so well in my hands as moderate doses of spirits of turpentine and liq. ferri perchlor. If those remedies are found useful in specific, they ought also to be of service in this affection, and I daresay the benzoate of soda would act beneficially, as I have used it in half-drachm doses very successfully in checking strumous purulent formations. The new remedy, calc. sulph., I have had no experience of, but I am strongly of opinion that it ought to be useful in pyæmic cases.—*Medical Press and Circular, July* 28, 1880, *p.* 69.

12.—ON IRREGULAR GOUT, WITH REMARKS ON THE PATHOLOGY OF GOUT.

By Dr. W. R. Thomas, Physician to the Sheffield Public Hospital; Lecturer on Medicine, Sheffield Medical School.

Gout presents itself in so many different forms that it is often difficult to recognise it when we meet with it, and many cases of real gout are no doubt frequently overlooked because the disease has not been found in its accustomed seat.

One patient suffers from bronchitis, another from psoriasis; one may have gravel with or without albuminuria, another may have gout in his big toe. It may present itself as asthma, or again as neuralgia of the face. One may be alarmed by his having to be treated for apparent gonorrhœa, while another may have diarrhœa with piles and tenesmus—all of which diseases may be but local exhibitions of constitutional diathesis.

Frequently I have found that some of the skin diseases we meet with are entirely dependent upon the gouty diathesis. One patient had been suffering from psoriasis for three or four years, had had the usual remedies prescribed, but without success. Finding that his brother had suffered from gout, that his father had died of apoplexy, and had often been laid up with gravel, I treated the case as one of gout, and the patient gradually improved. I really looked upon this case as essentially gout of the skin, considered that the gravel the father suffered from was dependent upon the same cause, and that in all probability the apoplectic attack was owing to chalky deposit in the walls of the arteries of the brain, in consequence of which these walls were impaired, ultimately gave way, and apoplexy was the result.

I have treated several cases of eczema in the same way whenever I have been able to find that there was any tendency to gout.

A patient of mine, who had suffered for several years from severe attacks of this complaint confined to the big toe, who had been a heavy drinker, and had lived well, one night, when the pain in his toe was excruciating, was tempted to put his foot in a vessel containing cold water to relieve the pain. This did certainly relieve his pain, but soon afterwards his breathing became extremely difficult. I had to be sent for, and found that he had all the ordinary symptoms of asthma. Having been told of the manner in which he had treated himself, I naturally looked upon the asthma as dependent upon gout, and applied local remedies to try, if possible, to cause a return of the disease to the toe, but without avail. This gentleman continued to have severe attacks for two years, but he found that when he abstained from excessive

eating and drinking , and took a reasonable amount of exercise, the pain to a certain extent was relieved. One day, when jumping out of a cab, he fell, and was laid up for weeks, for his old friend had returned to his big toe, took up its residence there, and frequently gave tokens of its presence whenever the owner of the toe acted unwisely.

How often we meet with patients who have suffered for days from many of the premonitory symptoms of gout, who have been, as it were, relieved of the gout by the passage of large quantities of gravel, in many instances calculi, and in one of my own cases the appearance of gravel alternated with gout in the big toe: a hint that we should treat such symptoms as gout whenever we have any suspicion of gouty diathesis, or where the habits of the patient tend to make us think that it might have been acquired.

One of my patients used to suffer from excruciating pain in the right sciatic nerve, along the greater part of its course; the attack generally lasted three or four days, and after an absence of four or five days returned. In this way he dragged on a miserable existence for three months. Finding that his grandfather had been a gouty patient and that one of his sisters had recently suffered from the same complaint, I treated this case as such with a certain amount of success. The following year he continued to pass for a considerable period large quantities of gravel, suffered from severe pain in the back, but never again from the sciatica; in fact, he became a very temperate man in every way; and I believe by so doing he succeeded in warding off the attack. I regard many of the neuralgiæ as really dependent upon the gouty diathesis probably due to the presence of chalky deposit either in the sheath of the nerve or somewhere in its course, in either case producing pain and irritation.

Frequently the gouty patient complains of pain in the back, and when the urine is examined, in addition to the salts, it contains albumen, a sign that disease of the kidneys is being produced by the gouty diathesis, and that there is danger of their being less and less able to perform their functions daily, more especially when deposit takes place in them, as proved after death by the appearance of white streaks of urate of soda.

I look upon gout when not hereditary as a disease invariably produced by excessive indulgence in food or drink, oftentimes accompanied by want of exercise. Excess of food by supplying excess of nitrogenous materials for the blood, tends ultimately to produce excess of urea and uric acid, which have to be expelled by the kidneys. These organs perform their functions properly for a while, but the excessive work thrown

upon them for a considerable time ultimately tends, as in chronic alcoholism and disease which interfere with the action of the skin, to produce disease and consequent inefficient action of the kidneys.

Distilled spirits do not seem to produce gout to the same extent as wine, porter, and ale. Although there is a great hereditary tendency in gout, still generations do escape because the children, having seen the sufferings of their parents, sometimes have the good sense to avoid the exciting causes, and thus escape.

We know that in gout we find an excessive quantity of uric acid in the blood, and that the quantity daily excreted by the kidneys is diminished, and as we frequently find that in other diseases accompanied by excessive formation of urea and uric acid the kidneys are quite able to excrete as much as is required of them, we may safely come to the conclusion that from some cause there is deficient action of these organs, and consequent retention of materials which ought to have been excreted; for the urates, cartilage cells, fibrous tissue, and epithelial cells seem to have an affinity, and deposit in and around them takes place, producing diseases of joints, eruptions of skin, and inflammations of mucous membranes.

New deposit may take place in the kidneys, interfering still more with the functions of those organs, to such an extent that it is not satisfied now with small joints at a distance from the heart, but attacks the larger joints.

Many can indulge in eating and drinking for years, and yet never suffer from gout. In such patients there does not seem to be any hereditary tendency, or they have organs which perform their functions well, and thus the blood is not, as it were, rendered impure.

Every excreting organ in the body has certain functions to perform, and if these are not performed properly either some other organ has to do the work, or there is retention of matter for excretion in the blood, unless it be deposited somewhere, in which case it is practically excreted; in fact, every portion of the body may be said, by relieving the system of what that part requires for its nutrition, to act as an excreting organ. Even the bones by taking up certain earths act as excreting organs to a certain extent.

Now, when there is excess of hydro-carbonaceous matter in the blood, we find that there is a tendency to increase of fat all over the body. These cells, which naturally tend to take up fat, now that it is in excess, take it up in excess, showing that the presence of certain materials in the blood influences the formation of tissue.

When the kidneys act imperfectly, and there is consequent retention of certain materials in the blood, these are taken up by cartilage, fibrous tissue, and epithelial cells, and produce gout.—*Lancet, Sept.* 25, 1880, *p.* 494.

13.—THE SALICYLATES IN ACUTE RHEUMATISM.

By the Editor of the Medical Times and Gazette.

With regard to the physiological effects of salicylate of soda Dr. Greenhow says :—"One of the most obvious effects of the treatment in the majority of cases was a speedy fall in temperature, sometimes within a few hours from commencing the treatment, and, save in a few cases, within two or three days. The pulse usually, but not invariably, came down in frequency with the fall of temperature. In forty-five out of the fifty cases certain well-marked physiological symptoms attended the reduction of the fever. There were effects on the nervous system, such as deafness, vertigo, headache, noises in the ears, delirium, and hallucinations. Deafness often occurred early, and was noticed in twenty-seven cases. Sometimes it was very intense. Vertigo occurred in fourteen cases. Very intense headache, chiefly frontal, though less frequent than deafness and vertigo, was, when it occurred, a much more distressing symptom. It was complained of in nine cases, and in one recurred until the resumption of the medicine. Delirium was present in eight cases; hallucinations in four. Great depression of the pulse and action of the heart was the most important effect produced on the circulation—more or less weakening of the pulse calling for stimulants in almost every case; great weakening of the impulse of the heart, and in ten cases almost complete obliteration of the first sound; pulse irregular and dicrotous in some. Vomiting occurred in twenty-two cases; great injection of the tongue in many cases; soreness of the tongue in three; and an aphthous state of the tongue in three cases. Diarrhœa in two cases was evidently referable to the salicylate. Epistaxis occurred in seven cases. In two transient albuminuria was observed; in two others tremor of the hand or tongue, which may not have been due to the drug."

These constitute serious objections to the use of any drug, yet few will deny that salicylate properly handled is a remedy of very great value in the treatment of acute rheumatism, and Dr. Greenhow "fully admits the great immediate relief which appears to follow the use of these agents in the treatment of rheumatic fever." But he questions, whether, on the whole, the salicylate treatment is successful. That, he says, must be tested by three considerations: the risk of complication, the condition of the patient on recovery, and the length of

time the patient is disabled. In every one of these particulars, especially with regard to relapse, Dr. Greenhow's experience leads him, he says, to go against the use of the salicylate. It does not even prevent hyperpyrexia, though a most powerful antipyretic. It tends, says the author, to produce anæmia, and the patients treated by it are slow to regain health and strength. Finally, he observes, "With regard, therefore, to the treatment of rheumatic fever with salicin and salicylate of soda, we must, I think, come to the conclusion that most physicians did with regard to the treatment with blisters, viz., that the pain and distress of the patients are undoubtedly for a time greatly assuaged, but that the duration of the illness is not shortened. Of the two plans I am of opinion that blisters applied in the vicinity of all the painful joints are by far the most efficacious and speedy in the relief they afford, and have the advantage of not producing so much subsequent debility. Another question now presents itself for our consideration, namely, whether it is not possible that some injurious consequence may result from the powerful action of the medicine upon the heart; and I am bound to confess my fears that the marked weakening of the first sound of the heart, present in so many cases, indicates the exertion of an influence upon the muscular structures of that organ which may not always pass entirely away when the treatment is suspended, and more particularly when either inflammation of the endocardium or pericardium, or of the muscular structure itself, exists during the treatment."

Our impression is that with salicylate, as with many other things, men have rushed to extremes. They have overlooked the true use and value of the drug, which is evidently to lessen fever and diminish pain; but that being done, its work is accomplished, and something else should takes its place. What that may be, will again be a question answered differently by different men. Some—happily, we trust, few in number—would look upon diet as of little importance, for in the discussion which followed the reading of the papers we find two men totally opposed to each other: one would give good diet; the other would be very careful—which means, practically, that the patient is to be mainly supported on what is sometimes described as low diet. But we are wandering away from the subject, the consideration of which cannot be thus cursorily dismissed.

By a curious coincidence, we have received, since the report was in type, the Nordiskt Arkiv, which contains an article on the very same subject, and from the *précis* it is evident that the author, whose experience is derived from the Hospital at Copenhagen, comes to conclusions very similar to those reached by Dr. Greenhow.—*Medical Times and Gazette, May* 29, 1880, *p.* 582.

14.—ON SALICIN, SALICYLIC ACID, AND SALICYLATE OF SODA IN RHEUMATIC FEVER.

By Dr. Charles Grove Young, M.Ch., Univ. Dub.

When one considers the various ways of treating rheumatic fever, almost every practitioner having some peculiar method of his own, and, no matter how different the actions of the medicines employed, still successful results obtained—some having good results from the "alkaline treatment," others from the "acid treatment," and, more remarkable still, other cases getting well without any treatment at all—one is inclined to believe that one remedy is as good as another against this disease.

Since Dr. Maclagan introduced to the notice of the medical profession the favourable results which followed the administration of salicin in rheumatic fever, notices of a number of cases of this disease, treated with salicin, salicylic acid, and salicylate of soda, have from time to time appeared in the different medical periodicals.

If the researches of Ranke and others are to be depended on, salicin, when introduced into the blood directly or by the stomach, is changed into salicylic acid; and if, according to Binz, salicylate of soda is decomposed by the carbonic acid in the tissues and blood, and salicylic acid set free, we need not make a distinction between cases treated with these preparations.

Salicylic acid and its salts are, no doubt, antiseptic in their action, but whether the acid or its salts have the greater antiseptic power is still a matter of some doubt. Kölbe, who first introduced it into practice, considered that salicylic acid possessed antiseptic properties of which its salts are devoid. J. Müller thought the acid more powerful than carbolic acid in preventing putrefaction and fermentation, and in stopping the action of inorganised ferments. With this end in view, it was used by Wagner in fermentative disease of the stomach and intestines. Senator's opinion was that salicin and salicylate acid are equally good as reducers of temperature in febrile conditions; he has used them in parametritis, enteric fever, and phthisis pulmonalis. Dr. Riess, of Berlin, also speaks favourably of these preparations as reducers of abnormal temperature. Fourteen cases of rheumatic fever, treated by Dr. Stricker, were relieved within forty-eight hours not only of their high temperature, but also of the pain, redness, and swelling.

A case of rheumatic fever was treated in the German Hospital by Dr. Weber with salicylic acid, fifteen grains being given every two to four hours; after the sixth dose the tempera-

ture was reduced from 101° to 98° with apparent convalescence. The remedy having been changed in favour of quinine and iron during three days, a relapse occurred, which quickly subsided when the salicylic acid was again resorted to. In a case of enteric fever, treated by Dr. Cavafy, published in the Lancet for November 4th, 1876, thirty grains of salicylate of soda, given in one dose, reduced the temperature from 103·8° to 100·8°—that is, 3°; the second dose was followed by vomiting, cold extremities, and a weak pulse; eight hours after the temperature was reduced to 96·9°. The medicine being withheld, the evening temperature rose to 103·6°—a rise of nearly 7°. During this time there was neither diarrhœa nor hemorhage. When the salicylate of soda was given, this patient had been ill twenty-six days, and during the greater part of this time the temperature was as high as 104°.

In the Lancet and British Medical Journal for 1876 are published twenty-six cases of rheumatic fever that had been brought to a successful issue by these preparations—viz., salicin, salicylic acid, and salicylate of soda, but this number does not include the successful cases published by Dr. Maclagan.

There is nothing remarkable about the ages of these cases, as they vary from twelve to thirty-two years, the greater number being between twenty and thirty years. The highest temperature ranged from 100·1° to 104·5°; in only one of these cases did it get so high as 104·5°. The history of this case is given so vaguely that one is unable to draw any certain conclusion from it, except that the patient was an able-bodied man; his temperature was reduced in three days to 99° by ten grains of salicylic acid every two hours; he had no heart complication; his pulse fell steadily from 92 to 78. The treatment was commenced on the second day of the attack, and convalescence began in three days. A pulse of 92, with a temperature of 104·5°, is something remarkable.

In two cases only did the temperature rise as high as 104°. One was that of a young man twenty-two years of age; there was no cardiac complication; he had been ill for two days before he came under treatment; eighteen grains of the acid every two hours reduced the temperature to normal in four days. The other case of this high temperature was that of a young woman of the same age. It was her second attack, and she had been ill ten days before she came under treatment. She had a systolic bruit—whether due to the previous attack or not is not stated; her temperature was reduced to the normal in three days by fifteen grains of the acid every two hours. In none of these three cases was there a relapse. These three cases speak well for the treatment, for in none of the eight reported by Dr. Maclagan, and treated in the same way, did the temperature

reach 104°. In the case of Dr. Cavafy, referred to above, the temperature was only 103·8°. The temperature in no case fell lower than 97·8°.

The temperature of the remainder of these twenty-six cases was not remarkable, and from studying their history we may, for the sake of convenience, divide them into two classes:—

1. Uncomplicated; and 2. Complicated.

In the first class the patients were suffering from the rheumatic fever for the first time—almost all of them were seen early in the attack; in some, treatment of various kinds was tried, but the majority of the patients were put on the salicylic treatment at once, in doses varying from ten to twenty grains every one, two, or three hours; they were relieved of their pain and swelling in from thirty-six hours to six days. Convalescence did not exceed twenty-two days, except in one case, in which the patient was not seen until he had been three weeks ill of the fever, and notwithstanding this he was relieved of the pain and swelling of his joints in three days, though he was not discharged cured for four weeks. In some cases the patients got well in a much shorter time—as early as eleven days from the commencement of the fever. On the whole, in these uncomplicated cases the period of time ill before the patient was put on the salicylic treatment does not appear to protract the period of convalescence, except in this one instance. Relapse occurred in only two cases.

In the second class—the complications being murmurs in the region of the heart, principally systolic—the patients were suffering from their second, and in some cases from their third, or even fourth, attack. It is more than probable that some of these complications were the remains of former attacks of rheumatic fever. It is very improbable that a person could have such repeated attacks without the heart suffering to some extent; and it is very hard—in a given case of rheumatic fever that has lasted for some time before it comes under observation, and has become, as it were, chronic, where a murmur has been developed at the first onset—to say that such a murmur was recent or due to some previous attack, unless the patient himself can throw some light on the matter. Be that as it may, they were all relieved of the pain and swelling in as short a time as in those cases that were not complicated by these murmurs, when they were put under the influence of salicylic acid or its compounds, with one exception; but the convalescence was protracted for a longer period—four weeks or more. A man aged thirty-two years, three days ill in his fourth attack before remedies were applied, was under the treatment three weeks, and his convalescence was prolonged to six weeks. It is rather difficult to say, in cases where the patients have suffered from

previous attacks, and where the time under treatment is prolonged, as in this case, whether this tedious convalescence is due to the number of previous attacks or to the number of days ill before the patient comes under treatment, or whether to the idiosyncracy of the patient, or to a combination of all these; but there is no doubt that these complicated cases were longer getting well than those that were uncomplicated. The duration of the period preceding observation cannot have much influence as a retarding agent, for some of the cases got well quickly, even when the patients had been in the fever some weeks before the treatment had commenced, while others, when the treatment dated from the second or third day, had a tedious recovery. In only one case among these successful cases is it stated that a mitral murmur was developed during the treatment, and in this instance the treatment was continued for nine days, the patient taking thirty grains of the acid every two hours, the dose being increased as the illness progressed. From this one case we cannot draw a general conclusion that recent murmurs have any influence on this treatment. Nor indeed can we say that cardiac complications are prevented by this treatment, this being the only case of these twenty-six successful ones in which it was noted that a murmur was developed under treatment, all these cases being particularly free from those complications that usually attend rheumatic fever. However, we shall see more on this subject when we come to study other cases which were not so fortunate in their results, although treated in the same way.

It is the commonly received opinion of medical men that salicylic acid and its salts have no direct influence on the heart, but that, by cutting the fever short, they do not give the heart time to become involved.

In a case of rheumatic fever following scarlatina, salicylate of soda had a good effect. The case was that of a little girl, seven years of age—a weak, delicate child, of slight build, pale, and anæmic—who had just passed through a mild attack of scarlatina, from which she was convalescent about a week. From the commencement of the scarlatina she complained of vague pains all over her body, but could not tell exactly where at first; but while desquamation was going on (which was principally on the thighs and hands), the pain appeared to settle in her limbs, but without swelling. As the desquamation passed off, the pain settled in the joints; at one time one would be attacked, at another time another, the child each day gradually getting worse, and at the end of a week swelling commenced, and she had again to take to bed, just four weeks from the first appearance of the scarlatina. There was no albumen in the urine at any time before or after the scarlatina.

Her mother was a large, fat woman, and had rheumatic fever four times, the small joints being principally affected; in her first attack she had been laid up nine weeks. The patient's brother had rheumatic fever once. This was her condition the first day she came under observation suffering from this complaint. The child is very pale; complains of pain in feet, ankles, hips, right wrist, hand, and fingers, which are red and painful, and all the joints, except the hip, swollen—even the small joints of right hand, and toes of both feet, but no pain in knees or shoulders; the heart sounds normal; respiration clear; tongue with a thick white fur on a light red base; urine abundant, and leaves a white deposit on cooling. This patient was put on salicylate of soda, and made a good recovery in eleven days. The treatment commenced on the third day. The quantity of the salicylate of soda taken every twenty-four hours was—third day, 7½ grains; fourth day, 7½ grains; fifth day, 30 grains; sixth day, 45 grains; eighth day, 25 grains; tenth day, 15 grains. She had no relapse.

As this patient took only 130 grains of the salicylate of soda in eight days, being on an average 16¼ grains per diem, we might ask ourselves the question—What influence has such a small dose on the disease? Would this little girl have got well in as short a time without any treatment at all, except keeping her in bed? If the cure of this case was due to the salicylate of soda, such a large dose as that recommended by Dr. Maclagan must be unnecessary. He says:—"I give salicin to adults in a dose of from twenty to thirty grains every two hours; in very acute cases I give that quantity every hour until pain is relieved"—that is, at the rate of from 100 to 150 grains every day, supposing the patient to be awake ten hours out of the twenty-four—rather under than over the mark; or in a very bad case, if the pain was not relieved for some hours, they would take a large quantity of the drug, and none of the successful cases referred to got such large doses as this. In Dr. Weber's cases, fifteen grains every two to four hours was found to be sufficient. It is very hard to say what might have been the result if this child had been put on larger doses, and at shorter intervals. No doubt a large dose at the beginning might have cut short the complaint advantageously to the patient, as it would have prevented the pain and discomfort of eleven days of the disease, but this is only problematical. I have often seen patients who were complaining of pains in their joints after severe wettings—such patients as one would say to, "Well, you are in for an attack of rheumatism"—get rid of their pains by taking fifteen grains of salicylate of soda at bedtime. But I have never seen a patient in undoubted rheumatic fever get rid of his pains by one heroic dose of any of these preparations under consideration.

The clinical chart showed that there was a gradual, but not uniform, fall in the temperature, pulse, and respiration, from the third day of the disease—the first of the treatment—to the tenth day. The temperature in this case was not very remarkable, the highest being 102·6°, and it fell to 97·6° on the eighth day. The heart's action was very rapid, but regular, rising to 160 beats per minute; there was neither endo- nor peri-carditis. The respiration was clear throughout, but very rapid, the rate being nearly double what it was when the child was in good health.

If we had only these successful cases to deal with, we might naturally come to the conclusion that a very useful remedy, not to say, "specific," had been found for rheumatic fever; but, as has been stated before, the successful cases were almost all free from cardiac complications, and in not one case did acute pericarditis manifest itself. Could this have been due to the remedy? Unfortunately we find published in the same periodicals other cases that show quite a different result from these—cases in which this mode of treatment was carefully tried, in some pushed so far that symptoms of poisoning by the drug manifested themselves; and although some of these patients died, others were brought round by other modes of treatment.

I think that we can legitimately draw the following conclusions:—Salicin, salicylic acid, and salicylate of soda are useful preparations in some cases of rheumatic fever. Cases in which they appear to do most general good are those that have no tendency to heart complications, the temperature not being high, and the patient being in his first attack. Such patients are relieved of the pain and swelling in from thirty-six hours to six days, and convalescence is completed in from ten to twenty-five days; and the length of time ill prior to treatment does not influence the treatment. Patients that have suffered from previous attacks, when murmurs in the region of the heart are left, are benefited by these preparations, as far as their recent symptoms are concerned, and in as short a time as those in their first attack, but their convalescence is more tedious. These preparations are useless, either as relievers of pain, or as reducers of temperature, in cases which are complicated with pericarditis, even when the temperature is not high; nor does their early administration, and in large doses, keep off this complication. They also appear to be of no use in cases that have a temperature higher than 104·5°. Contrary to the conclusion come to by Dr. Maclagan, the large doses recommended by him are not necessary—ten to fifteen grains every one, two, or three hours being sufficient. And in cases where these drugs do not seem to suit, the most commonly

observed symptoms are noises in the ears, accompanied with deafness and vomiting.—*Dublin Journal of Medical Science, Sept.* 1880, *p.* 193.

15.—ON WOOL-SORTER'S DISEASE.

By Dr. John Henry Bell, Medical Officer to the Bradford Infirmary and Bradford Eye and Ear Hospital.

The following paper, recently read before the Bradford Medico-Chirurgical Society, and since revised, will give an account of the disease as it occurs in Bradford, and perhaps assist others in its detection in those towns where wools and hairs are used for manufacturing textile fabrics.

The sorting of wool is generally considered a healthy occupation. The sorting of hairs, which are classed with wools, such as alpaca and mohair, has long been known to be attended with considerable risk to life. During my inquiry into the causes of this, I have found sufficient reason to include with them as similarly dangerous, all wools and hairs which are characterised by being dry, dusty, and more or less filthy from contamination with decomposing animal matter, and particularly if they contain "fallen fleeces" from diseased animals. Among these are, all kinds of alpaca, goat's hair, camel's hair, low-class East Indian, Persian, and such like wools. The sorting of these is injurious to health: first, from the dust and fine short hairs which arise from them, exciting chronic diseases of the lungs, as bronchitis and consumption; second, from the amount and virulence of poison from decomposing animal matter which is liberated, producing a low form of pneumonia, which I may call septic pneumonia; third, from a specific blood-poison, derived from the fleeces of animals which have died from anthrax, producing the rapidly fatal disease called "woolsorter's disease."

I have tried to ascertain the comparative health of persons sorting different kinds of wool, and find that the annual amount of sickness of the alpaca, mohair, and camel's-hair sorter, is almost double that of the British and Colonial woolsorter.

The number of deaths from diseases of the lungs, excluding phthisis, in the Bradford registration district of males aged twenty years and upwards for the ten years 1851-60, was 17·4 per cent. of the total deaths at these ages. In the Shipley sub-district, where alpaca and mohair are largely used, the proportion for the five years 1872-6 was 68·2 per cent. This excess of deaths from lung diseases (nearly four to one) does not apply to sorters of wool in other sub-districts where these dangerous hairs are not used.

Alpaca and mohair were introduced into the Bradford district

as textile materials about the year 1837. It was not until some years had passed that a suspicion arose among the workpeople that they were injurious to health; this was confirmed by time, and the disease, which could not be accounted for, was found to be confined to the sorters, and became known as "sorter's disease." At places where these materials are used in large quantities, sudden deaths of sorters are frequent. When these occur singly, and at some weeks' interval, little notice is taken of them; when, however, several men working together in the same room die from this mysterious disease within a short time of each other, considerable disquietude and alarm are caused among the workpeople; but only for a short time; the excitement soon subsides, and the work is continued. Men are willing to run the risk without complaint, and submit quietly to what they consider to be inevitable, although scarcely a month passes without the record of some death within the district from this disease.

At various times, eminent medical and scientific men have been consulted by different firms; post-mortem examinations, investigations, and reports have been made over and over again, without satisfactorily explaining its cause and nature, or lessening its frequency. It has now prevailed and been recognised in this neighbourhood about forty years, and notwithstanding all that has been done to prevent it, by ventilation, the use of respirators and other means, it still continues, as severe and frequent as it ever was, overclouding the life of the sorter with a mysterious shadow, and threatening him daily with death.

As years of increased fatality and alarm may be mentioned 1846, when it was first observed at Queensbury by Mr. Corrie of Thornton, and Mr. McLachlan of Shelf; 1853, when reported upon by Mr. William Field and Mr. Samuel Lodge of Bradford; 1854, again by Mr. Field and Mr. Lodge, who published a "Report of the Post-mortem Examination of the body of Henry Clarkson of Queensbury"; 1867-8, at Saltaire, when investigated by Mr. Rhind and Mr. Ellis of Shipley, and Mr. Marsdin, F.R.C.S., of Bradford (now of Eastbourne); 1874, at Saltaire, when Mr. Ellis published "A Few Observations on so-called Sorter's Disease," in which are included chemical and microscopical examinations of various samples of hairs and dust, by Professor Frankland, F.R.S.; 1876, outbreak at Queensbury, reported upon by Dr. Britton and Mr. Bramley of Halifax, Mr. Meade of Bradford, and Mr. Boynton Lee (Heckmondwike).

The sorting of inferior, dry, and damaged wools and hairs, if it does not cause illness, produces in most men "difficulty of breathing," "heavy oppression at the chest," "tightness,"

"dizziness," "alarming drowsiness," "drop to sleep any time," "cough," "sore-throat," &c. These effects are not due to the amount of dust, but are felt more particularly when bad bales are opened which contain fallen fleeces. The discomfort increases as the day advances, so that when they leave work they have little life or energy left, and are glad to get home. Many live several miles from their work, as they think the walk to and from the mill relieves the oppression of which they complain, and has a beneficial effect upon their health.

Case 1.—R. N., aged fifty-eight years, married, strong, stout, and healthy-looking; had been a sorter over forty years. His previous health had been good, not subject to cough even in winter, and was always very regular and temperate in his habits. For the last fourteen years he had worked at Saltaire, sorting alpaca, and had resided two and a half miles from his work, walking the distance night and morning. On June 25th, 1877, when he got home he said he had opened a bad bag, and had some very nasty and offensive work. He slept well through the night, was up early the next morning, had his breakfast, and did not say a word about feeling unwell. It was noticed that he perspired much at his work, but did not complain; and although he was not well he continued at his "board" till 10 o'clock a.m., when he left, saying he should fall if he did not go. He had great difficulty in walking home, so complete was his exhaustion. He perspired very much, and went to bed. As his breathing was rather oppressed, a mustard plaster was applied across his chest, and he took an emetic of mustard, salt, and warm water. He continued to get worse, and allowed me to be sent for. When I saw him at 7 o'clock p.m. he was in bed, on his back, perspiring freely. He had not shivered or felt chill; there had been no vomiting, thirst, or pain, tongue moist, slightly furred, and felt cold; some wheezing in trachea, very little cough, no expectoration, respiration 34, expiration prolonged; no dulness on percussion, some dry cooing sounds over right lung posteriorly, no moist sounds, pulse 100, very weak and irregular. Temperature, armpit 97·6°, under tongue 98·1°, within rectum 102·2°. At 11.30 p.m. his aspect was anxious, the face pale, with a slightly leaden hue. He said he felt "very poorly," "completely done," but had no pain, vomiting, purging, cough, or expectoration. No dulness on percussion of chest, respiration 40, laboured, long expiration, considerable dry sounds on right side, no moist sounds; temperature, armpit 96·6°, rectum 102·5°, pulse very rapid, irregular, and uncountable; hands, knees, face, and tongue cold, perspiring freely, mind clear. Urine, specific gravity, 1040. He died three hours afterwards. Duration, seventeen hours. No post-mortem examination.

[Several other interesting cases, and the following account of post-mortem examination in one case, are recorded by Dr. Bell].

By the courtesy of Mr. Whitteron I was present at the post-mortem examination, made by order of the coroner, sixty hours after death. The body was well nourished; rigidity moderate; sides of chest livid; skin of exposed scrotum and penis of a bright and dark-red colour; under parts of scrotum not discoloured; finger-nails blue-black. The pericardium contained about an ounce of sanguinolent serum. There was a sprinkling of light-coloured thin blood-spots under the epicardium of the left ventricle. Both sides of heart contained dark semi-fluid blood. The auricular septum was of a black-red colour from extravasation. The internal surface of the aorta was of a bright cherry-red colour. Two of the corpora Arantii of aortic valve were black from ecchymoses. Several points of attachment of the cords to the muscular columns of the mitral valve were similarly discoloured. Other parts of heart natural. Each side of the chest contained twelve to sixteen ounces of sanguinolent serum. The lungs floated in water. When cut into the structure appeared very close and full of black blood, but a small portion of the worst part, when removed, floated. No spots of ecchymoses beneath pleuræ, lining walls of chest, or peritoneum, on internal surface of abdominal walls, bowels, and diaphragm. The spleen, kidneys, and mucous membrane of stomach and bowels were not examined. Blood from the heart was added to a solution of sodic sulphate (one ounce to two ounces of water). When settled, the fluid was of a bright ruby colour, indicating change of corpuscles, and partial solution in liquor sanguinis.—*Lancet, June* 5, 1880, *p.* 871.

DISEASES OF THE ORGANS OF CIRCULATION.

16.—THE NEW CARDIAC SEDATIVE.

By the Editor of the Lancet.

The interesting experiments of MM. Sée and Bochefontaine on the action of erythrophleine, to which we called attention last week, deserve a more detailed description. In 1876, MM. N. Gallois and E. Hardy discovered in the Erythrophleum guineense, a leguminous plant, an alkaloid, erythrophleine, which they found to possess poisonous properties, and a remarkable action on the heart. The latter suggested to MM. Sée and Bochefontaine the probability that this alkaloid might be found useful in cardiac diseases. They therefore instituted a series of preliminary investigations into its physiological action,

and especially into those effects which could be recorded by the graphical method. They have communicated the results to the Académie de Médecine. They examined first its effects upon frogs, and subsequently those upon rabbits and dogs. The latter series are the most important. Hypodermic injection was chiefly employed. A centigramme, introduced beneath the skin of a dog, had no effect. Twice the quantity killed a large dog in two hours. They found that while one milligramme per kilogramme of body weight had no appreciable effect, a milligramme and a half was fatal in a few hours. The toxic power of erythrophleine appears thus to be about the same as that of Homolle's digitaline. The first sign of the toxic effect consists of restlessness, followed by a period of weakness, and this by vomiting or efforts at vomiting. The latter are the true initial symptoms of the toxic action, and, if the dose of the poison is not too great, they may cease. The animal then quickly returns to its normal condition. The circulatory apparatus is affected in a manner somewhat similar to the digestive. The intra-arterial pressure is increased, the pulse becomes irregular and then retarded. The retardation is characterised by the force of each pulsation, and by the uniformity of the intra-arterial pressure, which is not modified by the respiratory movements, as it is in the normal state. This period is followed by another, in which the pulse is extremely quick and feeble. The influence of the respiratory movements on the blood-pressure re-appears, the intra-arterial tension gradually lessens, the cardiac pulsations become weaker and weaker, and cease for a moment from time to time, and are at last permanently arrested. The respiratory movements seem to be directly influenced by the poison, as well as secondarily by the effect on the circulation. At first they are, as a rule, slightly slower and deeper than normal. When the heart's action is accelerated towards the end, the respirations are frequent and extremely energetic. In almost all the experiments the movements of respiration ceased at the same time as those of the heart, but in several cases the movements recommenced, and continued with energy for one or two minutes. The poison has a distinct action upon several parts of the nervous system. Thus faradisation of the peripheral portions of the pneumogastric nerves in the neck does not arrest the heart of an animal under the influence of erythrophleine as it does that of a healthy animal, and faradisation of the central extremities of these nerves does not accelerate the heart as it does in a healthy animal. Nevertheless, this procedure causes the same rise in pressure as under normal conditions. Immediately after death the heart is found in diastole, flaccid, but full of blood. Sometimes the ventricles present a tremulous movement similar to that which is seen after they

have been faradised. Usually the heart has not lost its electrical contractility. The pneumogastric nerve retains its action on the stomach. The excitability of the phrenic nerves is, however, lessened or even lost, while that of the sciatic nerve, and of the sympathetic, is not diminished. We are promised some further observations on the therapeutic uses of the drug.—*Lancet, July* 3, 1880, *p.* 24.

DISEASES OF THE ORGANS OF RESPIRATION.

17.—ON THE INHALATION OF CARBOLIC ACID IN DISEASES OF THE RESPIRATORY ORGANS.

By Dr. Robert Munro, M.A., Kilmarnock.

The recent publication of two articles in the British Medical Journal, one by Dr. J. B. Yeo (Dec. 20, 1879), "On the Treatment of Tuberculosis based on the Theory of the Bacteric Origin of this Disease, as suggested and carried out by Dr. Max Schüller," and the other by Dr. Mackenzie, of Edinburgh (Jan. 3, 1880), "On the Antiseptic Treatment of Phthisis Pulmonalis," affords me an opportunity of bringing before the profession the result of my experience of a similar mode of treatment which I have practised more or less for the last ten years in various lung diseases. Ever since I commenced the study of medicine, the treatment of inflammatory phthisis, chronic bronchitis, asthma, gangrene of the lungs, &c., by the inhalation of vapours to act either as stimulating lotions, antiseptics, or antispasmotics, according to circumstances, appeared to me so rational that I have given more than ordinary attention to the subject. My first experiments were made with sulphurous acid, creosote, carbolic acid, tincture of benzoin, and various ethers; but, since 1870, I have exclusively adhered, in the suppurating stages of diseases of the respiratory organs, to the simple plan of inhaling the steam from a solution of carbolic acid and hot water.

As my object here is to draw attention to the beneficial effects of this mode of using carbolic acid, I lay aside all theoretical considerations as to the nature of tuberculosis and the mode of action of the acid, and merely state, from an empirical point of view, some of the circumstances and cases that have led me to put faith in its efficacy.

Case 1.—In the autumn of 1869, J. S., a young solicitor, while spending a few holidays in Arran, was suddenly taken ill with profuse hæmoptysis, and, after recovering from the urgent symptoms, his physician ordered him to pass the winter in the south of England. During some months' stay in the Isle of Wight I understand he was pretty well and freely enjoyed out-door exercise, but after returning home he became worse. It

was then he came under my care, and, upon examining his chest, I found that his left lung was much diseased, that it contained cavities, and that he was suffering from all the usual symptoms of phthisis. For some time he was very weak, being confined to bed, and the expectoration increased and became so offensive that his friends found it disagreeable even to enter his room. In these circumstances I recommended the free inhalation of steam from a mixture of carbolic acid and water. This he did three times a day, for about a quarter of an hour each time, and from that day he commenced to improve. The expectoration gradually ceased, the lung soon cicatrised and healed up, and he finally recovered his former health and vigour, which I am glad to say he still retains.

Case 2.—Another case that gave me much encouragement occurred soon after the above. G. H., a young lad, a farm servant, called at my consulting rooms. His health had given way for some weeks previously, and he was obliged to give up work. Upon examination, the lower half of one lung was found to be quite solid, but as to the exact pathology of this condition I could not then form a definite opinion. My impression however was that it was not of a tuberculous character. For about a month there was no perceptible change in his condition, and then he ceased calling for me. Some weeks afterwards, however, I was requested to visit him at his father's cottage. I then ascertained that, in the interval, he had procured other medical advice to the effect that he was dying of consumption. He was now expectorating a large amount of offensive matter. I at once set him to inhale vapour saturated with carbolic acid, after which he made a rapid recovery, and when I last heard of him, some two years ago, he was a coachman.

Case 3.—In 1870 I attended M. B., a young lady suffering from enlarged strumous glands in the neck, which, with change of air, iodide of iron, and attention to diet, gradually became reduced, so that in the course of a few months her face assumed its normal appearance. A year afterwards her lungs became affected with tubercular deposits, and shortly after my attention was directed to her case, a cavity was diagnosed in the left lung. She passed the following winter at Cannes, but returned home next summer without having received much benefit. From what I had seen and learned during a winter's residence along the coast of the Riviera, while yet a medical student, of the misery and uselessness of sending invalids abroad in the last stages of consumption, I then resolved never to recommend such a change to my patients, unless, judging from the history and progress of the disease, there was a fair probability of their being able to live over the winter and return home. Partly for this reason,

and partly owing to a decided aversion on the part of Miss B. to going abroad again, it was decided that she should remain at home during the next winter. In these circumstances my attention was more particularly directed to her treatment, and, along with various other hygienic and dietetic recommendations, I advised the frequent inhalation of carbolic acid. At the end of the winter she was considerably better, and, in the course of the following summer, her cough had completely disappeared. For upwards of two years Miss B. continued well, and got much stouter and perfectly healthy like. She then commenced, though contrary to advice, to go to evening parties, till, on one occasion, having joined in every dance in the evening's programme, she caught cold, and succumbed to a rapid attack of acute phthisis.

Case 4.—In March, last year, I was called to attend a young lady who was suffering from acute phthisis. The disease had made considerable progress, so that a few days after I had first seen her expectoration commenced, and shortly afterwards several small cavities were detected in the upper lobe of the left lung. Her constitutional history was very unfavourable (her mother and several brothers having died of tubercular disease of the lungs), and from her extreme weakness both Professor Gairdner and I had little hopes of even a temporary improvement. In mentioning the good results I had occasionally seen from the inhalation of carbolic acid, Dr. Gairdner stated that his attention had already been directed to this mode of treatment by Dr. Scott, of Dumfries, and he cordially agreed with me that it should be continued in Miss T.'s case. Notwithstanding her great prostration, caused by heavy expectoration, night perspirations, and diarrhœa, my patient gradually improved, so that in October she had hardly any cough, and was able to visit some friends in England. Shortly after her return she was taken suddenly ill by convulsions, with severe pain in the head, and tubercular disease of the brain gradually developed itself. This metastasis of the disease continued for two months with the gravest symptoms, such as sudden and acute paroxysms of pain, unequally dilated pupils, imperfect vision (often seeing double), and deep sleep, with moaning. When coma and death seemed fast approaching, active disturbance re-appeared in her chest, and immediately the head symptoms improved, but she quickly succumbed to the fresh outburst in her chest.

Case 5.—In chronic bronchitis the effects of the inhalation of carbolic acid are most beneficial. Patients invariably tell me that they are the better of it. Just lately, a lady, in the course of a casual conversation, mentioned that she was on her way to visit a brother (Captain M., residing at a distance), who was

ill with bronchitis, and had been subject to this disease for years, and asked if I could not suggest some remedy as he was now glad to try anything. I gave her instructions how to use the inhalation of carbolic acid, and next time I saw this lady I was informed that her brother never tried anything that did him so much good, and that he had completely recovered in about a week.

Case 6.—Another young gentleman, to whom I recommended this treatment some years ago, in somewhat similar circumstances, told me lately that it was the only thing that did him good, and that ever since he has been in the habit of using the inhalation of carbolic acid and hot water for ordinary colds, which he says it speedily cuts short. Many others have expressed a similar opinion as to its efficacy in influenza and catarrh of the nasal organs.

Dr. Donald M'Leod (Kilmarnock), writes to me as follows regarding his experience of this mode of using carbolic acid: "For the last six or seven years I have extensively prescribed carbolic acid by inhalation, in the treatment of chest complaints. The affections in which I have had most experience of its use, are:—Chronic bronchitis, bronchiectasis, fibroid phthisis, and gangrene of the lungs. I recommend its use much the same as you advise. It is especially in fibroid phthisis I have seen the happiest result follow its use by inhalation.

"In these cases of fibroid phthisis, accompanied by profuse muco-purulent expectoration, I have almost in every case observed that it lessened the expectoration, consequently allaying, if not subduing, the constitutional disturbance caused by the accumulation of such material in the lungs and air passages.

"In gangrene of the lung, the fœtor and noxious secretion are perceptibly diminished during the first few days of its use; unquestionably, along with stimulants and good nourishing food, in this complaint the inhalation of the vapour of carbolic acid deserves the name *curative*. Possibly this title is applicable to the result of the remedy in this case above all others.

"The administration of remedies by inhalation in lung diseases appears to me so rational, that I often wonder they have not come into use much earlier, especially the vapour of carbolic acid; no doubt, medicated vapours have been long in use, much more so in times past, until the last few years; but the mode of administration was so defective that the practice fell into desuetude. The preparations of tar, so long vaunted in cases of chest complaint, have all been superseded by this, the chief of the remedies used in these complaints.

"In cases of empyema, communicating with the air passages, accompanied with fœtid expectoration, I would say that the

inhalation of carbolic acid vapour is a highly efficacious remedy. I regret I have mislaid a paper containing a description of cases of the different diseases mentioned above, treated by inhalation of the vapour of carbolic acid."

Remarks.—The above are merely illustrative, and by no means isolated cases, in which the inhalation of carbolic acid has proved beneficial in my experience; and although I do not vaunt it as a specific for phthisis pulmonalis, I am certain that it has helped to cure some cases that would otherwise have died. As I commenced to use it at first on the supposition that it acted as a disinfectant and stimulating lotion to the ulcerated and diseased tissues of the lungs, I have only tried it in the second or suppurating stage of phthisis, but of course the real benefit might have been due to the destructive influence of the acid on the bacteric germs. I have observed that little good followed the inhalation unless it was used frequently, and latterly I have been in the habit of seeing that the patient performed the act of inhalation properly, as many were apt to draw the steam merely into the mouth without actually inspiring any of it. Dr. Schüller recommends a solution of benzoate of soda (2 to 5 per cent.), to be inhaled by means of a spray producer, two to four times a day, for about half-an-hour each time, while Dr. Mackenzie practises the inhalation of carbolic acid or creasote by means of a respirator containing a sponge saturated with a strong solution of the drug. I always use the inhalation of steam from a mixture of carbolic acid and hot water (℥ i to the pint), by means of an inhaler, or even a common jug. Whatever the result of a more extended trial of the inhalation of carbolic acid in phthisis pulmonalis may be, it must be borne in mind that its application in this form does not interfere with, nor is it intended to supersede, the use of constitutional and internal remedies.—*Glasgow Medical Journal, Oct.* 1880, *p.* 291.

18.—ON THE TREATMENT OF ASTHMA.

By Dr. J. B. Berkart, Senior Assistant-Physician to the City of London Hospital, &c.

From the earliest days of the history of medicine until the present moment, narcotics, antispasmodics, *et hoc genus omne*, have been, severally or in endless combinations, and with no sparing hand, applied to every orifice of the body for the purpose of subduing the nervous irritability supposed to be the essence, or at least the chief element, of asthma; and yet, notwithstanding the indubitable efficacy of these remedies, the records of medicine contain not one single instance in which that practice has produced, at best, a more than temporary benefit.

Enthusiastic therapeutists, it is true, allege that in some cases antispasmodic fumes, a certain mixture taken three times a day, and a certain pill at night, have led to the happiest results; but the remark they add, that the patients had to carry about with them their panacea, to be used with every recurrent attack, somewhat obscures the brilliancy of their success. The bulk of practitioners have been less fortunate in their experience as regards relief or cure of asthma; and their opinion that this is the most intractable of all diseases is unhappily in strict accordance with facts.

No sadder impression can be received than by studying what is still current for the pathology of asthma. Not only in science, but in the ordinary business of life, if a given conclusion prove faulty, the rule prevails to seek the source of error by examining the propositions; but, in the case of asthma, this elementary principle of reasoning has been persistently neglected. Here experience has shown that a certain treatment, consisting in the administration of the most potent remedies, does not produce the expected effect. Instead of inquiring into the principles upon which that treatment is based, the question is shelved by assuming a "double capriciousness" of the disease as the cause of failure. But this is not all: the commonest matter of fact in relation to asthma is mystified and perverted. If a dyspeptic suffer after a heavy meal from flatulence and dyspnœa, the fruit or cheese with which the repast was finished is considered a "highly asthmatic article." If dust inhaled at the seaside impede respiration, "the air of Margate is unsuitable." And not the least painful matter is that, if facts and arguments be adduced to show the puerility of such reasoning, they are met by an unanswerable "I believe". If medicine were an abstract science, one might smile at such process of reasoning; but where, as in medicine, every theory even unconsciously influences practice, the utter want of logical thought must have the most pernicious consequences. If proof of this were needed, I would point to the innumerable instances which yesterday were considered to be, and treated as, "purely spasmodic asthma," but which to-day present themselves as hopelessly incurable phthisis. If further proof were needed, there is the practical outcome of the prevailing theory, as shown by the advice of Hyde Salter: "Give it a shake; make some change, *any* change, no matter whether the object is very definite or the therapeutics very rational.... the most blind and purposeless treatment may be attended with the happiest results."

The fact is, asthma must remain a stigma on medical science, and the lucrative pursuit of speculative druggists, until its pathology is correctly understood. That the subject is some-

what obscure will be readily admitted; but what obscurities there are may be readily removed. It will be remembered that when, at the commencement of the present century, the systems of medicine were swept away, the diagnosis of cardiac and pulmonary affections was established upon the study of "physical signs" during life, and upon the changes in the organs as observed after death. Only one "essential" disease was admitted upon the absence of these criteria, and that disease was "asthma." I will not now repeat what I have elsewhere stated *ad nauseum*. At present, I only venture to remark that, if the physical signs of asthma were as broadly significant as those of certain forms of pneumonia and of pleurisy, a well-trained nurse could readily replace the physician. The superiority of the latter consists, according to my mind, in his power of observing facts, in interpreting and comparing them, and in arriving this way at the hidden truth.

Nothing, I repeat, but the correct knowledge of the pathology of asthma shows the means of speedily and safely relieving the paroxysms, and of preventing their recurrence. It alone guards against the indiscriminate administration of the most useful remedies; for, unless they be given in suitable circumstances, in sufficiently large doses, etc., the benefit they are capable of producing is unattainable.

It lies in the nature of asthma that the treatment of the paroxysms should be paramount. No one who has ever witnessed an asthmatic seizure would for a moment hesitate to relieve the patient by any means in his power; and, however repugnant it must be to use preparations of unknown composition and of unknown action—as are the various specifics recommended in newspapers—even their exhibition would be willingly connived at, provided there were no rational means for the attainment of the same end. But no specifics are needed. The remedies in general use suffice for every contingency. Of course, the *ideally* perfect treatment would be to apply such remedies as, by removing the urgent symptoms, would exert at the same time a favourable influence upon the disease itself. Unfortunately, the most reliable remedies in use are of so slow operation as to be practically useless during the paroxysm, because the patient cannot or will not submit to measures which do not afford immediate benefit. Only one remedy—jaborandi and its alkaloid pilocarpin—approaches more nearly than any other the above requirement.

The powerful revolution which pilocarpin produces in the distribution of the blood must necessarily have a very beneficent influence in some forms of asthma; for, by attracting a large volume of blood to the skin and to the salivary glands, and by diminishing its volume through the copious perspiration and

salivation, the congested internal organs are relieved in a corresponding degree. An adequate conception of the pathological changes in the lungs, indicating the use of pilocarpin, may be formed by observing an analogous process in the lower extremities. In connection with varicosities, the leg at one time increases in circumference, the pale and dry tissues presenting a peculiar inelastic and spongy feel; at another, the enlarged leg has a dark brown colour, and its tissues are apparently indurated; at another, in these circumstances, an ulcer developes itself. *Mutatis mutandis*, the same takes place in the lungs; only the interstitial changes in the lungs—in origin, in nature, and in progress precisely similar to those observed in the legs—are not amenable to diagnosis, unless they perceptibly diminish the volume of air, or interfere with its entrance or exit to and from the lungs by implicating the bronchi. Here, then, pilocarpin has the same effect as the bandages in varicosities of the extremities. Within a few minutes, the application of the drug is followed not merely by amelioration of the subjective symptoms, but by a corresponding improvement of the physical signs. Of course, a remedy that so powerfully exalts one function necessarily depresses another, and therefore its use requires some caution. But with a little attention the remedy can be safely and successfully managed. I have found the alkaloid preferable to the plant because: 1, it acts more rapidly; 2, it does not produce strangury; and 3, the dose can be more accurately determined.

Those whose cardiac muscles are from whatever causes in a state of fatty degeneration, may, under the influence of pilocarpin, present the most alarming symptoms. However, the cause for alarm soon spontaneously subsides, the heart regaining its previous force; but if it lingered to do so, a subcutaneous injection of 1-120th or 1-60th grain of atropine immediately restores the balance. Pilocarpin is more suitable in the treatment of the younger asthmatics, but is by no means contra-indicated in patients of more advanced age. The dose should not exceed one-third of a grain. I have never used more than ten drops of a two-per-cent. solution. During the action of the drug, the patient should preserve the recumbent posture—which the almost immediate relief obtained will enable him to do—and he should be carefully watched until the effect has passed off. It is desirable to have a solution of atropine always at hand in case of need. It is well, also, not to use pilocarpin soon after the patient's meals; if the dyspnœal seizure occur under these circumstances, there are, it is needless to say, other remedies more suitable.

The following case will show the immediate and the remote effects of pilocarpin.

Case 1.—J. C., aged 63, retired *employé* of the Fire Brigade, applied at Victoria Park Hospital on March 6, 1879, complaining of dyspnœa, with nocturnal exacerbation, so that he had been forced to spend the nights in his chair. He was of temperate habits. He became, six or seven years ago, subject to cough, from which he had suffered since. The expectoration was not copious, and consisted of a few hard lumps. He was of middle height, somewhat obese, with pale face, strong bones, muscular; was evidently suffering from dyspnœa. Tongue clean. Respirations 30. Pulse 80, regular, and of slight tension. No increased temperature. Thorax wide; the movements were equal on both sides; the lungs were distended, Resonance in the right front and back was diminished, and there was absence of respiration; the left front and back were superresonant, whistling sounds were heard at the apex, and coarse rhonchi at the base. The heart was covered; its sounds were feebly audible, but clear.

3.7 p.m. Ten drops of two-per-cent. solution of pilocarpin were injected.

3.10 p.m. Perspiration commenced at the forehead.

3.12 p.m. Salivation commenced.

3.13 p.m. Pulse 94-96. He felt his breathing much easier. He perspired freely; slight salivation.

3.24 p.m. A sphygmographic tracing was taken. Perspiration persisted. He felt easier; could lie down.

3.30 p.m. He felt easier; respiration quite free, 28. The whistling at the left apex was replaced by subcrepitant *râles*, and, instead of the complete silence on the right side, there was now normal inspiration and expiration.

3.45 p.m. Observation was continued by Mr. Lund (the clinical clerk). The pupils acted to light; he expectorated whitish phlegm; breath easier; the whole of the body perspired; his face was flushed. Pulse 88; respirations 28.

3.50 p.m. The cardiac action quite regular; there was very little salivation. Breath easy. Pulse 98.

4.3 p.m. Breathing was quite free; he felt much better; his whole body was in a glow, but he did not feel thirsty. Pulse 98; respirations 32.

4.10 p.m. Perspiration stopped. Breathing was quite easy; the *râles* at the left base were considerably diminished in number and intensity; at the right base behind, slight subcrepitant rhonchi were heard. He felt better every way; and left the hospital. He was ordered to take an ounce of aqua menthæ piperitæ three times a day, ut aliquid fiat.

J. C. attended for five successive weeks, and declared himself improved. He could now lie down and sleep at night.

He still coughed, but expectoration was easier than it formerly had been.

Case 2.—Wm. R., a tailor, aged 66, was seen July 29, 1879, labouring under great dyspnœa. He stood with his hands resting on a table, his neck stretched, his chin raised, gasping for breath, and pathetically told me that thus he had passed most of his nights for the last fourteen years. He complained of tightness across the chest, of incessant cough, and of scanty and difficult expectoration. In short and broken sentences, he stated that he had been subject to "colds" for many years previous to the appearance of his asthmatic seizures, which had come upon him with an attack of bronchitis. Treatment had hitherto been of little avail; at times his distressing symptoms had somewhat abated, so that he had been able to do some work, but they had never entirely disappeared. For years he had been unable to lie down at nights; he could sleep only in a half-sitting posture. He had seldom passed a night without spending part of it on the edge of his bed, coughing.

W. R., of average height, pale, emaciated, had, as is typical in such cases, marked kyphosis. The upper costal arches were wide and prominent, the lower contracted. Respiration was heaving, 24; expiration relatively prolonged. Resonance of the upper third of the lungs was deficient, and that of the middle and lower rather tympanitic. Both lungs extended to the sixth ribs. Vesicular murmur was completely masked by sonorous rhonchi, which were heard with inspiration and expiration over the greater part of the chest, front, and back; while at the bases a faint cooing was audible. Cough produced no change in these sounds. There was epigastric pulsation. The heart was covered. The impulse of the apex was neither seen nor felt, and the sounds were drowned by the noise in the lungs. Pulse 78, regular, somewhat large and soft. The patient was with difficulty put to bed, and at 3.45 p.m., ten drops of a two-per-cent. solution of pilocarpin were injected into the left forearm. The injection, it is needless to add, was absolutely painless.

3.49 p.m. His face was flushed. Perspiration commenced at the forehead. Tears ran down the left cheek, on account of epiphora of the left side. There was no salivation. The oppression at the chest was relieved; the breathing was less noisy than before.

3.55 p.m. Pulse 84, fuller than before. Breathing was easy and noiseless. The patient could recline. His body was covered with perspiration. There was no salivation. Rhonchi were considerably diminished; inspiration and expiration were now audible over the upper lobes. The obstruction at the bases had diminished.

4 p.m. He looked flushed. There was copious perspiration all over the body. No salivation. Breathing was easy, not accelerated. The patient repeatedly acknowledged the relief.

4.3 p.m. A small quantity of limpid urine passed without pain.

4.10 p.m. Pulse 92, regular, less full, but of greater tension than before. He complained of uneasiness at the epigastrium.

4.12 p.m. He had some nausea. A few thick, yellow, roundish sputa were raised without difficulty. Perspiration continued.

4.30 p.m. Nausea persisted. Breathing was easy. There was no cough nor expectoration. Respirations 20. The rhonchi had disappeared. Pulse 84, small, regular. Perspiration continued.

6 p.m. Perspiration had entirely ceased. There was no vomiting. A cup of tea at five o'clock had immediately stopped sickness. Breathing was easy. The resonance of the chest was considerably improved; respiratory murmur was audible all over the thorax; there were no rhonchi. The patient felt sleepy.

July 30, 11 a.m. The patient passed a very good night; he awoke only once, at about 2 a.m., with slight cough. For the first time for many years, he had been able to lie down. Breathing was easy, and air freely entered and passed out of the chest.

Case 3.—Henry B. P., carman, aged 37, of intemperate habits, applied at the hospital on Feb. 13, 1879. He complained of dyspnœa, of cough, of difficult expectoration—the sputa being thick and yellow. Rhonchi were heard all over the chest. His tongue was clean; appetite good. The bowels acted daily. He was ordered to have an ounce of compound cascarilla mixture three times a day. I saw him for the first time on Feb. 20, 1879, in the presence of Mr. Reilly of Globe Road. There was no improvement in the above symptoms; on the contrary, he felt worse. The patient was suffering from great dyspnœa; his face looked dusky, and over the malar bones quite cyanotic. Respiration was heaving, 24; pulse 84, regular, soft, and small.

The patient was of middle stature, poorly nourished, and stooping, in consequence of a kyphosis. He had for sixteen years been subject to cough and nocturnal dyspnœa.

On examination, the thorax was observed to be contracted at the bases, the upper costal arches being comparatively wide and prominent. Resonance of the upper lobes was dull, but cleared up towards the bases. Sonorous rhonchi were heard all over the chest. At 3 p.m., ten drops of a two-per-cent. solution of pilocarpin were injected into the left arm. Three

minutes after the injection, the face was flushed, perspiration commenced at the forehead and gradually spread over the body. The pulse became full and bounding. The patient declared himself greatly relieved. On listening to the chest, there were sonorous rhonchi at the right, and cooing at the left, upper lobes, while the bases remained obstructed. Perspiration increased, bathing the whole body. The patient was told to lie down and to rest until the effects of the drug had passed off; but he felt so much better, that he did not think it necessary to wait. However, on proceeding to dress, he became giddy. He was immediately placed upon the couch, but had soon to get up to pass urine, which was done without pain. On regaining the couch, giddiness continued. He then complained of nausea, and in a short time vomited, without effort, a great quantity of undigested food. Vomiting was repeated, and nausea and giddiness persisted. The patient moaned a great deal, and thought he was dying. He had severe pain in the left hypochondrium. The body, previously in a glow, was then covered with cold clammy perspiration. There was no pulse at the wrists, and the cardiac action was feeble; respiration was superficial and slow, and some tracheal rattling was heard. There were, in fact, all the alarming symptoms of collapse. However, the injection of one drop of liquor atropiæ (*P.B.*) changed the scene almost instantaneously. The pulse at the wrists returned, the cardiac action became perceptible, the breathing deeper, and the patient declared himself free from giddiness and nausea. Perspiration ceased, and he felt cold and shivering. The breathing was easy; there was no cough nor expectoration. At 4.30 p.m., the subjective and objective symptoms were greatly improved, and the patient left the hospital. He was ordered to take an ounce of aqua menthæ piperitæ three times a day, *ut aliquid fiat.*

On Feb. 27, he reported himself greatly improved in health. He had felt nothing but a little cold when he had returned home last week. The cough and expectoration were gone. His breathing was quite easy. He had a good appetite; almost too good, he added, for his means. He was cheerful, dressed in his Sunday clothes, and thought of returning to work. There was still deficient resonance and cooing at the left upper lobe; but the access of air to the rest of the lungs was unimpeded. He presented himself, as I wished him, the same evening, before Mr. Reilly, who was thus able to observe the remarkable improvement.

In May 1879, the patient returned to the hospital. He had resumed his work, but also his dissolute habits. He had again some cough; but, in order to get rid of it as soon as possible, he requested a certificate for admission into a seaside convalescent home.

Case 4.—J. B., tailor's cutter, aged 27, with no hereditary disposition to disease of the chest, enjoyed good health until he was seized at Glasgow, in September 1878, with nocturnal dyspnœa, wheezing, and cough. These symptoms persisted in spite of treatment when I saw him on Dec. 9th, 1878. The patient was under-sized, very muscular, but pale, and his eyelids were baggy. He complained chiefly of the dyspnœal seizures, recurring almost every night, and accompanied by wheezing so loud as to be audible at a distance. His thorax was roomy, and his vertebral column straight and somewhat twisted to the left. There was deficient resonance in the left infraclavicular region. In both suprascapular fossæ, there was harsh respiration with dry rhonchus which, however, was conducted to them from the larynx, this being in a state of chronic inflammation. There were sonorous rhonchi at both bases. The rest of the lungs, the heart, all the abdominal organs, including the kidneys, seemed healthy. The treatment was continued from Dec. 9, 1878, to Feb. 12, 1879, but produced no decided amelioration. The dyspnœal attacks and the wheezing were relieved but returned at intervals of from two to three days. On Feb. 12, several patches of broncho-pneumonia were detected in the left axillary region and at the angle of the right scapula. There were rhonchi all over. The patient was ordered an infusion of a drachm of jaborandi.

Feb. 13, 1879. The patient looked pinched. The jaborandi had produced its well-known effects. There was decided improvement of all the subjective symptoms, and the physical signs showed nothing but obstruction of the bases.

March 13 and 19. The infusion of jaborandi was repeated; and since then the patient had entirely recovered. He had ever since been free from cough and dyspnœa, and had remained hitherto in the uninterrupted enjoyment of good health.

Case 5.—R. P., stableman, aged 52, of diminutive stature, greatly emaciated and cyanosed, had for many years been subject to cough with difficult expectoration, and to dyspnœa with nocturnal exacerbations. During the last six months, his health had been so bad that he could not do even a little light work. There were the unmistakable signs of chronic broncho-pneumonia; and the dyspnœal seizures were due to recurrent congestions of the lungs and to repeated obstruction of the bronchi. He was treated from the commencement of February to the end of March 1879, by injections of pilocarpin, six upon the whole, of which each was given at one week's interval. The effect of the pilocarpin was precisely as in the cases above mentioned; only this patient greatly suffered from salivation, owing to the œdematous condition of his buccal mucous

membrane—a state he acquired by his excessive smoking of tobacco, of stramonium, and, of late, of tobacco mixed with arsenic. The local application of atropin previously to the injection of pilocarpin did not prevent salivation; nevertheless the patient was anxious to have the injections repeated, such was the relief they afforded him. At the end of March, he had considerably improved. The cyanosis had entirely disappeared. He looked pale, but his breath was free. He could lie down at night and sleep undisturbed by cough or by dyspnœa. There was also considerable improvement in the objective signs. He was then anxious to return to his work. I saw him again in May 1880. He had spent, he told me, a better winter than he had done for many years. He coughed at times; but his breath was much easier. All he now complained of was that he could find no work.

In all the cases above referred to, the asthmatic paroxysms were speedily—within a few minutes—relieved by pilocarpin; and that relief was due, not merely to the suppression of the painful perception of the dyspnœa, but to the removal, as far as practicable, of its immediate and remote causes. Moreover, the improvement lasted long after the effects of the drug had passed off, and in several instances it was almost complete. Considering the decrepitude of those patients, the unfortunate circumstances of their surroundings, and their inability of following the reparative process thus initiated, the success was all that could be expected. Klebs, it appears, has obtained equally favourable results by the same means. "In the very obstinate forms," he writes (Allgemeine Wiener Mediz. Zeitung, No. 1, 1880), "of catarrhal inflammation of the lungs proceeding from cavities, which again and again return, usually accompanied by fever, but occasionally without it, I have never seen a lasting benefit from the use of so-called expectorants. Here pilocarpin, one-sixth of a grain applied by subcutaneous injection, has rendered the best services."

A drawback to the administration of pilocarpin may be supposed to exist, in that it occasionally produces nausea, and even collapse. However, as I have already mentioned, these unpleasant after-effects may be to a great extent obviated by precautionary measures, and it is quite possible that the smaller dose, which Klebs recommends, may be sufficient also in the cases of asthmatics, and free from every inconvenience. If, nevertheless, on that score objections were raised to its use, it needs, to refute them, but be remembered, that most of the palliative remedies of asthma—especially the so-called depressants—are attended by very disagreeable symptoms, which often persist for days after their administration; and thus it will be found that, after all, the balance will be in favour of pilocarpin.

It is superfluous to add, that not every case called "asthma" is on that account adapted for treatment by this drug. As is well known, a great variety of affections, with nothing in common but one—and this the most conspicuous—symptom, are comprised by that name, so that the remedial measures must necessarily differ according to the nature of the pathological state.

Again, the place of pilocarpin in therapeutics is determined by its physiological action. In all cases of chronic pneumonia, in which the nutritive disturbance proceeds from the surface of the bronchi and gradually spreads to the stroma of the lungs, or in which it commences in the interstitial tissue and implicates the mucous membrane of the air-tubes—whether the process terminates in atrophy or in sclerosis—there pilocarpin, provided the state of the heart offers no contraindication, will prove beneficial. More speedily and more safely than any other remedy, it relieves the congestion of the bronchial mucous membrane, favours the expulsion of the obstructing plug of the air-passages, prevents the formation of viscid mucus, diminishes the swelling of enlarged bronchial glands, and initiates a reparative process, if such be yet possible, in the infiltrated connective tissue of the lungs. Although in its effect it somewhat resembles that of a warm, or rather of a Turkish bath, it is for many reasons preferable to the latter, even in the intervals between the asthmatic seizures, when alone there can be a question of substitution. To obtain, however, the full benefit it is capable of producing, pilocarpin should be used systematically. It should be injected at intervals, commensurate to the forces and to other circumstances of the patient, until the pathological changes in the lungs are perceptibly improved.

I propose to trace the indications for the purely medicinal treatment of those forms of asthma which are distinguished by the frequency of their occurrence and by the severity of the symptoms.

Foremost amongst them is œdema of the lungs, as it occurs in the obese and the cachectic, and in those suffering from valvular lesions of the heart, from gout, and from renal disease (uræmic asthma). It is invariably the result of a temporary failure of the left ventricle, while the right is still able to act; and developes itself, either in the midst of apparently perfect health with the suddenness of a fainting fit, or as a rapid exacerbation of an existing cardiac derangement. To understand its pathology, it is well to remember that the constitutional and local causes just mentioned tend to impair the nutrition of the cardiac muscles to an extent varying from the cloudy swelling of the individual fibre, to its brown atrophy or fatty degeneration. The heart, notwithstanding these changes,

continues, in ordinary circumstances, to perform its function in accordance with the requirements of the organism, and without painful perception by the patient. It is only when an increased demand is made upon its energy, and on the accession of an irritation, that the organ manifests its inherent weakness, by its inability to meet the one and to resist the other, even if both are so slight as to be powerless to cause disturbance in a healthy person. Œdema is thus readily produced by imperfect ventilation of the lungs, as it arises from the rapid extension of bronchitis, from embolism of a large branch of the pulmonary artery and from extensive meteorismus. The reason is, that the blood, abnormally rich in carbonic acid, irritates the centres of respiration and circulation, and that, finally, while the right ventricle is able to empty part of its contents into the pulmonary artery, which possesses no tonus, the left is incapable of doing so, on account of the increased tension of the systemic vessels.

In these circumstances, the subcutaneous injection of one-sixth of a grain of morphia acts, indeed, like a charm. As soon as the morphia is absorbed, which requires a longer time than in health, the painful oppression of the chest and the hacking cough disappear; the noisy and frequent respiration becomes quiet and slower; the cyanosis of the face and lips gives way to a flush; the cold and clammy skin becomes warm and moist; the contracted artery widens and fills; the heart regains its previous force and rhythm, and with them return its impulse, its sounds, and its murmurs, while the consequence of its temporary failure as regards the lungs subside more or less completely. There is, subsequently, neither languor nor drowsiness, even in those who at other times are very susceptible to the influence of narcotics. Morphia merely counteracts the effect of the abnormal quantity of carbonic acid in the blood, and, with the attainment of that object, its influence is exhausted, as shown by the following cases.

Mrs. H., aged 42, tall, stout, has for several years been subject to cough and to attacks of dyspnœa. In the foggy weather of November 1879, she was seized with smarting of the eyes; a great deal of sneezing, and running from the nose; an eruption of the upper lip; sore-throat; harsh and painful cough, with scanty expectoration, and much dyspnœa; all the symptoms which, if they occur in summer, are supposed to form a special disease called hay-asthma. On Saturday, November 15th, she went to Eastbourne to get rid of her "cold," but, on arrival, all the symptoms, especially the dyspnœa, became much worse, and on Monday she had to return home. I saw her on November 17th, 1879, at 7 p.m., and noted the following. She sat in bed; she was cyanotic; there was great dyspnœa; she complained of pain across the chest

and at the insertion of the diaphragm; there was a painful cough, with scanty expectoration; the extremities were cold. Pulse was very small, rapid, and almost countless; respiration noisy, frequent; there was a loud laryngeal noise. The chest-wall was raised: the sterno-mastoids were firmly contracted; the thyroid lying beneath the manubrium; the tongue was clean. On the right, front and back, the percussion-note was flat; there was very feeble respiration above, and moist rhonchi at the base. On the left, front and back, better resonance, dry, and loud rhonchi from apex to base. The impulse of the heart was not felt; its area was enlarged to the left; sounds very feeble. Injection of morphia hydrochlorate, gr. $\frac{1}{6}$. In ten minutes, perspiration commenced; the breath was easier, respiration deeper and slower, and the pain diminished. The laryngeal noise disappeared, the resonance of the right side improved, and inspiration was feebly heard; on the left, respiration returned, and the rhonchi became moist; the rhonchi at bases persisted; pulse improved; cardiac sounds distinctly heard. The patient was perspiring much when I left. November 18th. She passed a tolerably good night, but had no sleep. The cough was troublesome; the expectoration became more copious, and consisted of black mucous substance mixed with soot. A rational treatment of her bronchitis was now adopted, and she recovered by the end of the week.

Mr. L., aged 62, tall, stout, for twenty years subject to gout, had signs of dilatation of the left ventricle, and of degeneration of the cardiac muscles. In December 1878, he had an attack of gout in the left toe; subsequently, other joints were affected, and at last both lower extremities swelled. Bronchitis then followed, complicated by attacks of asthma. His friends noticed that he had frequent fainting fits; his face suddenly turned blue, the heart seemed to stop, and cold perspiration appeared on the forehead. On December 10th, 1878, when I saw him, he had great dyspnœa, with loud wheezing and troublesome cough. He felt exhausted from the many sleepless nights through which he passed. Respiration rather frequent, The large and roomy thorax was generally deficient in resonance, and, on auscultation, there were loud, sonorous, and sibilant rhonchi from apex to base. No cardiac impulse was seen or felt. The action of the heart was rapid, its sounds impure. The pulse was empty; there was considerable anasarca; the urine was scanty, but not albuminous; the tongue was thickly coated; great tympanitis; constipation. At 5 p.m., injection of hydrochlorate of morphia gr. $\frac{1}{6}$. Immediate relief. He was ordered pil. hydrarg. gr. x. There was much improvement the next morning; the patient had passed a good night: he had no dyspnœa; the cough was less troublesome; and he

had slept several hours. His bowels had copiously acted. He had a light breakfast, which he enjoyed. The expectoration consisted of a few pellets of black mucus. The thorax was much clearer. The pulse was felt at the wrist; it was frequent and intermittent. Now that the pressing symptoms of the moment had been successfully combated, a deliberate treatment was adopted, by which the patient greatly benefited.

In all cases of that kind, the subcutaneous injection of morphia is preferable to the internal administration of opium; for, in the first place, the action of opium is not quite identical with that of its alkaloid; and, in the second, the absorption by the gastric mucous membrane is, owing to the stasis in the systemic vessels, slow and imperfect; so that, to obtain rapidly the desired effect, a very large dose would be required, of which the consequences would be still felt when the indication for the use of the drug had passed off. If, nevertheless, opium has to be administered internally, it should be given in a moderately large dose, and should be combined, to facilitate its absorption, with stimulants, as ether or aromatic spirit of ammonia.

But I must not omit to add that the subcutaneous injection of morphia is an operation with the performance of which neither the patient nor his friends may be entrusted. It is an operation, useful only in special circumstances, satisfying the imperative demands of the moment, but incapable of producing more than a transient benefit. Its thoughtless repetition with each recurrent attack not only not relieves—unless the dose be considerably increased—but aggravates the disease. A craving for morphia is readily established, but not easily eradicated.

To the use of stimulants in these cases the same objection applies as to that of opium. Their action, even in large doses, is comparatively slow; and, though they temporarily restore the activity of the heart, they do not remove so rapidly and so fully as morphia the peripheral obstacle—viz., the increased arterial tension. Dr. Thorowgood recommends large doses of caffein—four grains in a cup of coffee (*loc. cit.*, p. 72). This preparation is, I presume, indicated if it be desired to produce copious diuresis, so as to diminish the volume of the blood; but, on account of the peculiar rigidity of the cardiac muscles which large doses of caffein are apt to produce, that remedy should be cautiously used.

The distressing form of dyspnœa which arises from extensive meteorismus requires for its relief the removal of the fermenting substances, either by emetics, if they are as yet in the stomach, or by enemata, if they are retained in the descending colon or rectum. If the removal be impracticable, the fermentation may be arrested by small (five-grain) doses of chloral-

hydrate, or by about two drachms of the creasote mixture (*P. B.*), both of which—the former with the addition of a little mucilage—are given in some aromatic water. After one or two doses of these mixtures, the intense symptoms soon subside.

In cases of obstruction of the air-passages by plugs of mucus, the means of relief vary according to the position of the latter. Emetics are indicated if the block exist in the peripheral portions of the lungs; and, as they are employed only on account of the mechanical compression of the chest in the act of vomiting, preference is therefore to be given to those remedies which produce the least amount of depression. Hence the sulphate of copper or of zinc is preferable to antimony or ipecacuanha. I have frequently made subcutaneous injections of apomorphin—from one-twelfth to one-tenth of a grain—and I have found them best answer the purpose.

Vomiting, *i.e.*, compression of the chest, has little influence on the plugs of the larger bronchi. Hyde Salter correctly observed that, in the cases in which ipecacuanha afforded relief, this occurred before vomiting took place; and he truly remarked that ipecacuanha acted as a depressant—not, as he imagined, by relaxing the bronchial spasm, but by producing serous exudation around the tough pellets of mucus. The same effect, however, may be obtained in a less circuitous route, and with less general disturbance. The "antispasmodic fumes," which have been empirically recommended, owe their virtue to the presence of ammonia, and to that of picolin, of pyridin, of lutidin and collidin, as they are evolved in the combustion of nitre-paper, of stramonium, of tobacco, and of the various patent "smoking mixtures." Ammonia and the members of the picolin series produce, when inhaled, intense hyperemia, as may be seen in the buccal, pharyngeal, and laryngeal mucous membranes of habitual smokers; and the exudation accompanying the hyperemia tends to soften and to detach the obstructing mucus. Germain Sée has introduced for the purpose iodide of ethyl, of which from six to ten drops inhaled greatly increase the bronchial secretion. Its effect is transient, but unquestionably curative in cases of chronic bronchitis; whereas the fumes of stramonium and of similar drugs, especially if often repeated, aggravate the disease by the intense and lasting congestion which they produce.

The liquid extract of quebracho has of late been largely employed in the treatment of asthma. As yet, there is no indication for its use, except the presence of dyspnœa. A teaspoonful, repeated, if necessary, at intervals of ten minutes, certainly relieves, as I have observed, the dyspnœa of phthisis, of pneumonia, of pleurisy, of emphysema, and of valvular lesions. It has failed of its effect, so far as I have seen, only

in two cases of aortic disease; in the one, the patient had been for years accustomed to inhale nitrite of amyl almost every two hours; in the other, there was complication with marked attacks of stenokardia. The active principle of quebracho appears to be a gum-resin; but as to its mode of action nothing is known. I have frequently noticed that, after the administration of the drug, there is slight flush of the face, perspiration, and occasionally drowsiness; but there are no objective signs on the part of the heart and of the lungs sufficient to account for the relief.—*British Medical Journal, June* 19 *and* 26, *and July* 17, 1880, *pp.* 917, 960, 79.

DISEASES OF THE ORGANS OF DIGESTION.

19.—ON DIGESTIVE FERMENTS.

By Dr. WILLIAM ROBERTS, F.R.S., Physician to the Manchester Royal Infirmary; Professor of Clinical Medicine to the Owens College.

The Milk-Curdling Ferment.—One of the most striking properties of gastric juice is to curdle milk. This property is utilised on a large scale in the industrial art of making cheese. Rennet, which has been used for that purpose from remote antiquity, is simply an infusion of the fourth stomach of the calf in brine. The curdling of casein by rennet does not depend upon the acid of the gastric juice, for it takes place when the milk is neutral or even faintly alkaline. It has until lately been believed that this property was an inherent attribute of pepsin, but this opinion is no longer tenable. Brücke succeeded, by a process I need not particularise, in producing pepsin which had an energetic action on proteids, but which did not possess, except in the feeblest degree, the power of curdling milk. Mr. Benger also found that an extract of pig's stomach in saturated brine, while it possessed energetic action as a milk-curdler, had comparatively only feeble proteolytic powers. We must therefore regard the agent in gastric juice which curdles milk as a distinct substance from pepsin.

In the course of my experiments on pancreatic extract, I made the unexpected observation that the pancreas also contained an agent capable of curdling milk. I found this property in the pancreas of the pig, the sheep, the calf, the ox, and the fowl. In whatever way the extract of the gland was made, whatever solvent was used, this property of curdling milk was present in it; but the brine extract exceeded all others in curdling capacity. If a few drops of extract of pancreas be added to some warm milk in a test tube, the milk becomes a

solid coagulum in a few minutes. Some minutes later the whey begins to separate from the curd. In short, the action resembles exactly that of calf's rennet; and, so far as I know, you could make cheese with pancreatic rennet as perfectly as you can with gastric rennet. There is, however, not an absolute identity of the two agents. I said just now that gastric rennet produced curdling in neutral and even in faintly alkaline milk; but if the alkali exceed a very small proportion, ordinary rennet does not curdle milk. I found that an alkalescence exceeding that produced by one grain of bicarbonate of soda to an ounce of milk altogether prevented the milk being curdled by gastric rennet. But this is not so with pancreatic rennet. You may add two, three, or four grains of bicarbonate of soda to each ounce of milk, and still the pancreatic rennet will induce curdling with undiminished energy. Milk is likewise curdled by pancreatic extract when quite neutral, and even when very faintly acid. Indeed, it appeared to me that a very faintly acid milk curdled more actively with pancreatic extract than neutral milk, but not so actively as alkaline milk.

That the curdling agent of the stomach and pancreas is a true ferment, and not some inorganic chemical agent, seems to be proved by the fact that boiling, or even heating to 160° Fahr. (70° C.), instantly destroys its power. I found, moreover, that, like other soluble ferments, it is precipitated, but not truly coagulated, by alcohol, for it recovers its solubility and activity when the alcohol is removed, even after a contact of several weeks.

The curdling ferment of the pancreas is a distinct body from trypsin, as the following experiments show:—1. Some brine extract of pancreas (which was known to possess strong proteolytic energy) was acidulated with hydrochloric acid in the proportion of 1 to 1000, and then placed in the warm chamber at a temperature of 104° Fahr. (40° C.) for a period of three hours. It was then carefully neutralised with bicarbonate of soda. When thus treated, the extract was found to have lost its proteolytic power, but its curdling action on milk was almost as energetic as ever. 2. A portion of the same brine extract of pancreas was filtered under vacuum pressure through porous earthenware. The filtered product was found to possess an undiminished faculty of curdling milk, but it had almost no power of dissolving the curds. The curdling ferment had evidently traversed the earthenware freely, but only traces of trypsin had passed through.

What is the real function of the curdling ferment? Seeing its striking reaction with milk, one's first idea is that it must have something to do with the digestion of casein. But a little consideration shows that this idea is altogether improbable.

Although all mammalia start life on a milk diet, milk does not form a part of the normal diet of any adult creature except man. Nor can its universal presence in the mammalian digestive organs be regarded as a vestigial phenomenon—a "memory" of the suckling phase of their existence—for the same curdling property is found in the stomach and pancreas of the fowl, which never at any period of its life fed on milk. Moreover, it may be doubted whether the ferment in question is the actual agent which curdles milk on its passage into the stomach; for the acid of the gastric juice, which also curdles milk, would probably be beforehand with it, inasmuch as its action is a good deal more prompt than that of the ferment. In the pancreatic digestion of the milk, occurrence of curdling has appeared to me to be a distinct hindrance to the process. Has this ferment any true digestive functions? I think this is quite open to doubt. Its action on milk is apparently akin to that of the fibrin-ferment on blood; and it may likewise have some kindred purpose—but what that purpose may be I am unable to conjecture.

Emulsive Ferment.—Digestion of Fats.—The digestive change undergone by fatty matters in the small intestine consists mainly in their reduction into a state of emulsion, or division into infinitely minute particles. In addition to this purely physical change, a small portion undergoes a chemical change, whereby the glycerine and fatty acids are dissociated. The fatty acids thus liberated then combine with the alkaline bases of the bile and pancreatic juice, and form soaps. The main or principal change is undoubtedly an emulsifying process, and nearly all the fat taken up by the lacteals is simply in a state of emulsion, and not of saponification. It is, however, quite certain that both these processes do take place in the small intestine, though in very unequal degrees. The only question in connection with the digestion of fat which I propose to examine is—Whether these changes are produced by the operation of a soluble ferment, or by some other and different agencies? In his latest utterances on this subject, Bernard insisted that the digestion of fat, like the digestion of starch and proteids, consisted in the action of a soluble ferment, which he named *Ferment emulsif.* This ferment, he alleged, first emulsified and then saponified fats. In the intestine the change scarcely went beyond emulsion. In this condition fat was found in the contents of the lacteals. Saponification took place almost exclusively further on, and later, in the blood. It is certainly established that the pancreatic juice exercises a marked influence on the digestion of fats; and it is in the pancreas, according to Bernard, that the emulsive ferment is to be found. Bernard demonstrated that healthy pancreatic juice has quite a special

faculty of emulsifying fats. Pancreatic tissue has also the same property. If a portion of fresh pancreas be rubbed up with fatty matter and water, you get an emulsion which is fairly persistent. I have not had an opportunity of examining the behaviour of pancreatic juice with fatty matter, and cannot therefore speak of its properties; but it is singular if, as alleged, the effect of pancreatic juice and pancreatic tissue on fat be due to the presence of a soluble ferment, that the extracts of pancreas possess none of the same power. I have made extracts of pancreas in various ways—with simple water, with chloroform-water, with dilute spirit, with solutions of boracic acid, of borax, and of both combined, with glycerine and water, with brine, and with solution of salicylic acid, and of salicylate of soda; and yet I could not satisfy myself that any of these extracts possessed any special power of emulsifying fats, nor of liberating the fatty acids and inducing saponification. Paschutin states that the emulsive ferment of the pancreas can be extracted by a solution of bicarbonate of soda. An extract of pancreas made by myself with a two-per-cent. solution of bicarbonate of soda was indeed found to have a very marked emulsifying power, but it had the same power, even in an enhanced degree, after being boiled—which showed that its emulsifying properties could not depend on the presence of a soluble ferment.

I was equally unsuccessful in my attempts to verify the alleged power of extracts of pancreas, and of crushed pancreatic tissue, to liberate the fatty acids. When fresh pancreas, finely triturated with sand, was digested with milk in the warm chamber, I could not obtain satisfactory evidence of the development of free acid from the decomposition of the fat of the milk by a soluble ferment. The pancreas itself yields a slightly acid solution when infused in water, and a mixture of milk and pancreatic tissue always showed a slight acid reaction; but when this primary acidity was neutralised, no further production of acid took place until such a time had elapsed as was sufficient to permit the development of organised ferments and the origination of the lactic fermentation. If the development of organised ferments was prevented by the addition of antiseptics, such as chloroform or a combination of boracic acid and borax, a mixture of milk and crushed pancreas remained neutral for several days. The same results followed when I operated on emulsions made with crushed pancreas and lard or olive oil. In my numerous observations on the digestion of milk with various pancreatic extracts, I never could detect the production of an acid reaction unless organised ferments were permitted to intervene.

I obtained similar negative results with almond emulsion.

Bernard attributed the formation of an emulsion when almonds (or other oily seeds) were rubbed up with water to the presence in the seeds of a soluble ferment. But I found, to my surprise, that almonds which had been boiled for seven hours still produced a perfect emulsion. As all know soluble ferments are destroyed by boiling, this result seems irreconcilable with Bernard's view. I also found that almond emulsion kept in the warm chamber for six or eight hours at a temperature of 100° Fahr. (38° C.) showed not the slightest evidence of an increase of its original faintly acid reaction. It appeared to be more probable that the fatty matter in the almond existed in the seed in the condition of a solid emulsion, and that the formation of a fluid emulsion by trituration with water was due simply to the liberation of the minutely divided oil particles, rather than to the intervention of a soluble ferment.

It is with considerable hesitation that I venture to place myself even in apparent contradiction with so great an observer as was Claude Bernard; and I by no means pretend that these observations traverse the main conclusions for which he contended as to the digestive transformations of fat in plants and animals. The views which Bernard developed on the digestive process are based on inductions so wide, and observations so multiplied, that I feel satisfied that their substantial accuracy will be ultimately established in regard to fat, as they have already been established in regard to starch and cane-sugar.

Some observations made by Brücke promise to throw a fresh light on the digestion of fat. Brücke found that oils and fats which contained an admixture of free fatty acids—in other words, which were more or less rancid—were emulsified by a slight agitation with a weak solution of carbonate of soda. J. Gad extended these observations, and showed that even simple contact of a rancid oil with the alkaline solution was sufficient to effect a mechanical division of the oily matter. I have repeated these observations, and the results are certainly remarkable. The different behaviour of two specimens of the same oil, one perfectly neutral and the other containing a little free fatty acid, is exceedingly striking. I have here before me two specimens of cod-liver oil—one of them is a fine and pure pale oil, such as is usually dispensed by the better class of chemists; the other is the brown oil sent out under the name of De Jongh. I put a few drops of each of these into these two beakers, and pour on them some of this solution, which contains two per cent. of bicarbonate of soda. The pale oil, you see, is not in the least emulsified; it rises to the top of the water in large clear globules: the brown oil, on the contrary, yields at once a milky emulsion. The pale oil is a neutral oil, and yields no

acid to water when agitated with it—in other words, it is quite free from rancidity; but the brown oil, when treated in the same way, causes the water with which it is shaken to redden litmus paper. I was surprised to find that olive oil (salad oil), which appeared quite sweet, and had not the slightest taste or smell of rancidity, gave a milky emulsion with the soda solution. This oil did not yield any acid reaction to water when agitated therewith. Nevertheless, it evidently contained a little free fatty acid (probably oleic acid, which is insoluble in water, and therefore does not acidify water shaken up with it), for when a portion of this oil was washed with a strong solution of carbonate of soda, and then allowed to separate, the oil thus freed from acid no longer gave an emulsion with the weak soda solution. It would appear that an admixture of only a very small proportion of free fatty acid is sufficient to induce emulsification—a quantity so small as not to cause any appreciable rancidity to the senses of smell or taste. This specimen of almond oil is to all appearance perfectly sweet, but it communicates a rather sharp acid reaction to water shaken up with it, and it gives, as you see, an instantaneous and perfect emulsion with the soda solution.

The bearing of these observations on the digestion of fat is plain. When the contents of the stomach pass the pylorus they encounter the bile and pancreatic juice, which are alkaline from the presence in them of carbonate of soda, so that the fatty ingredients of the chyme, if they only contain a small admixture of free fatty acids, are at once placed in favourable circumstances for the production of an emulsion without the help of any soluble ferment, the mere agitation of the contents of the bowel by the peristaltic action being sufficient to effect the purpose.

This view of the matter renders it necessary that fresh inquiries should be made into the effect of gastric digestion on fats. It has hitherto been supposed that fatty and oily substances undergo no change in the stomach, but it is quite possible that something may have been overlooked. It was noted by Richet in the patient with a gastric fistula that the fatty matters were detained a long time in the stomach, and that they only passed through the pylorus with the last portions of the meal. It is also a familiar experience to most dyspeptics that rancid eructations are a frequent occurrence in the later stages of gastric digestion. If it should turn out that among the complex opeations taking place in the stomach there occurred some slight decomposition of the neutral fats, and a liberation of a small quantity of free fatty acid, such a result would supply the necessary condition for the emulsification of the neutral fats in the duodenum. In speculating on this subject it is difficult to

shut one's eyes to the possibility of the intervention of formed or organised ferments in the digestive process. It is well known that fatty acids are liberated in the decomposition of neutral fats by bacterioid ferments (zymophytes), and the presence of ferments of this class in the living stomach has been so repeatedly observed that it may well give rise to the suspicion that they are a normal ingredient of the gastric mucus, and have a normal function to perform in the digestion of some portions of our food. It is not, however, desirable to push speculations of this kind in advance of observed facts, and I only mention them as hints for further inquiry in regard to the digestion of fat.—*Med. Times and Gazette, May* 15, 1880, *p.* 523.

20.—ON THE PREPARATION AND USE OF ARTIFICIALLY DIGESTED (PEPTONISED) FOOD.

By Dr. William Roberts, F.R.S., Physician to the Manchester Royal Infirmary, &c.

Any extract of pancreas may be used for the preparation of artificially digested food, but the most suitable are those prepared with dilute spirit or chloroform-water. The extract sent out by Mr. Benger under the name of "Liquor Pancreaticus," is an almost faultless pharmaceutical preparation. It is made by extracting perfectly fresh and finely chopped pancreas with four times its weight of dilute spirit.

Pancreatic Digestion of Milk.—When milk is subjected to the action of pancreatic extract at a temperature of 100° Fahr. (38° C.), in an open glass vessel, a series of changes takes place in it, which are highly interesting to watch. The first thing that arrests the observer's notice is that the tough wrinkled skin which quickly forms on the surface of warm milk when exposed to the air is either not produced at all, or is only produced in a very imperfect degree. In its stead there forms a slight brittle and perfectly smooth pellicle of quite a different appearance. The next thing noticed is that the milk becomes more or less softly curdled. By-and-by the curds begin to re-dissolve, and the milk gradually re-assumes its originally diffluent condition. A portion of the curd is, however, very resistant, and remains undissolved for many hours. If the milk be diluted beforehand with one-third or one-fourth of its bulk of water, this curdling phase is altogether omitted, or is only observed as a slight and transient thickening. Next follows a very curious change of aspect. The milk loses its glossy white appearance, and gradually assumes a dull yellowish-grey shade which is characteristic, and the degree of which enables the practised eye to judge with considerable precision how far the peptonising process has advanced. This change of aspect

is, however, by no means conspicuous, and would scarcely be remarked in a cursory observation, except by comparison with unaltered milk. While these changes are proceeding, the milk gradually loses its proper flavour, and at length developes a pure bitter taste, which is to many palates not disagreeable. No really unpleasant flavour is produced, unless the process is allowed to go on to incipient decomposition.

The progressive transformation of the casein into peptone, of which these outward signs are the indications and accompaniments, may be followed by testing the milk from time to time with acetic acid. At first the addition of the acid causes an abundant precipitation of curdy matter, but this reaction progressively diminishes in intensity until at length it ceases altogether. When this point is reached the transformation may be regarded as complete. All the casein has been changed into peptone—even nitric acid no longer causes a precipitate. The time occupied in the transformation (supposing the temperature and the activity of the preparation to be constant) depends on the quantity of pancreatic extract added, and may be made to vary from a few minutes to several hours. In the ordinary operation of preparing peptonised milk for invalids, two or three teaspoonfuls of the liquor pancreaticus are added to one pint of milk, diluted with a fourth of its bulk of water. With these proportions the process is usually completed in from two and a half to three hours.

Modified Casein or Metacasein.—The conversion of casein into peptone does not take place by a direct transformation of the one body into the other. You all know that milk does not curdle or coagulate in the least degree on being boiled, but when milk is subjected to the action of pancreatic extract (provided no alkali is added), it speedily loses this negative property and curdles abundantly on boiling. This coagulation on boiling is most intense a few minutes after the addition of the extract, and it very gradually diminishes in intensity as the action goes on, and ceases altogether at the same time that acetic acid ceases to cause a precipitate. It was, moreover, found that if the milk was boiled at the period of the greatest intensity of this reaction, and thrown on a filter, the whole of the albuminoid matter of the milk was caught on the filter in the form of curds, and the filtrate showed not the slightest reaction of casein. These reactions revealed the interesting fact that in the transformation of casein into peptone by pancreatic extract, the first step in the process is the conversion of casein into an intermediate body, and that it is this intermediate body which is subsequently gradually changed into peptone. This body may provisionally be called *metacasein*, signifying thereby that it is still casein, but in a modified condition. Metacasein

is characterised by two reactions, which taken together, serve to distinguish it from other proteid bodies—it is coagulated by boiling in neutral media, and it is precipitated in the cold by acetic acid. The conversion of casein into metacasein in pancreatic digestion takes place almost suddenly, as is shown by the following experiment:—Five cubic centimeters of pancreatic extract were added to 100 cubic centimeters of milk, diluted with one-fourth of its bulk of water, and maintained at blood-heat. The first slight, almost doubtful, evidence of coagulation on boiling was perceived in three minutes; in five minutes coagulation on boiling was pronounced; and in nine minutes it had reached its maximum. From this point coagulation on boiling, and precipitation on the addition of acetic acid, diminished in intensity *pari passu* very gradually for a period of two hours, when both reactions finally ceased.

Taking these observations and reactions together, it is evident that the conversion of casein into metacasein constitutes a first and distinct step in the transformation of casein by trypsin, and that this step is antecedent to the further and slower changes by which metacasein is transmuted into peptone. It is impossible not to see in this a striking analogy with the sudden transformation of gelatinous starch into soluble starch under the action of diastase, as described in a previous lecture.

When milk is rendered slightly alkaline by the previous addition of a little bicarbonate of soda, no precipitation on boiling occurs during its digestion by pancreatic extract. But the metacasein is nevertheless produced, and its presence may be detected by carefully saturating the alkali, and then boiling. For although metacasein is precipitated on boiling when the solution is neutral, it is not precipitated when the solution is even slightly alkaline. This is the reason why, in preparing peptonised milk for the sick, it is desirable to add to it a small quantity of bicarbonate of soda.

The foregoing account of the behaviour of milk with pancreatic extract will greatly facilitate the comprehension of the practical rules which must be followed in preparing peptonised dishes for invalids. I confine myself for the present to articles of which the basis is milk, or farinaceous gruel, or both together.

Peptonised Milk.—A pint of milk is diluted with a quarter of a pint of water, and heated to a temperature of about 140° Fahr. (60° C.). Two or three teaspoonfuls of liquor pancreaticus, together with ten or twenty grains of bicarbonate of soda, are then mixed therewith. The mixture is then poured into a covered jug, and the jug is placed in a warm situation under a "cosey," in order to keep up the heat. At the end of an hour or hour and half the product is boiled for two or three three minutes. It can then be used as ordinary milk.

The object of diluting the milk is to prevent the curdling which would otherwise occur and greatly delay the peptonising process. The addition of bicarbonate of soda prevents coagulation during the final boiling, and also hastens the process. The purpose of the final boiling is to put a stop to the ferment action when this has reached the desired degree, and thereby to prevent certain ulterior changes which would render the product less palatable. The degree to which the peptonising change has advanced is best judged of by the development of the bitter flavour. The point aimed at is to carry the change so far that the bitter taste is distinctly perceived, but is not unpleasantly pronounced. As it is impossible to obtain pancreatic extract of absolutely constant strength, the directions as to the quantity to be added must be understood with a certain latitude. The extent of the peptonising action can be regulated either by increasing or diminishing the dose of the liquor pancreaticus, or by increasing or diminishing the time during which it is allowed to operate. By skimming the milk beforehand, and restoring the cream after the final boiling, the product is rendered more palatable and more milk-like in appearance.

Peptonised Gruel.—Gruel may be prepared from any of the numerous farinaceous articles which are in common use—wheaten flour, oatmeal, arrowroot, sago, pearl barley, pea or lentil flour. The gruel should be very well boiled, and made thick and strong. It is then poured into a covered jug, and allowed to cool to a temperature of about 140° Fahr. Liquor pancreaticus is then added in the proportion of a tablespoonful to the pint of gruel, and the jug is kept warm under a "cosey," as before. At the end of a couple of hours the product is boiled, and finally strained. The action of pancreatic extract on gruel is twofold—the starch of the meal is converted into sugar, and the albuminoid matters are peptonised. The conversion of the starch causes the gruel, however thick it may have been at starting, to become quite thin and watery. The bitter flavour does not appear to be developed in the pancreatic digestion of vegetable proteids, and peptonised gruels are quite devoid of any unpleasant taste. It is difficult to say to what extent the proteids are peptonised in the process of digestion by pancreatic extract. The product, when filtered, gives an abundant reaction of peptone; but there is a considerable amount left of undissolved material. Most of this, no doubt, consists of insoluble vegetable tissue, but it also contains some unliberated amylaceous and albuminous matter. Peptonised gruel is not generally, by itself, an acceptable food for invalids, but in conjunction with peptonised milk (peptonised milk-gruel), or as a basis for peptonised soups, jellies, and blanc-manges, it is likely to prove valuable.

Peptonised Milk-Gruel.—This is the preparation of which I have had the most experience in the treatment of the sick, and with which I have obtained the most satisfactory results. It may be regarded as an artificially digested bread-and-milk, and as forming by itself a complete and highly nutritious food for weak digestions. It is very readily made, and does not require the thermometer. First a good thick gruel is prepared from any of the farinaceous articles above mentioned. The gruel, while still boiling hot, is added to an equal quantity of cold milk. The mixture will have a temperature of about 125° Fahr. (52° C.). To each pint (550 cubic centimeters) of this mixture, two or three teaspoonfuls of liquor pancreaticus and twenty grains of bicarbonate of soda are added. It is then kept warm in a covered jug under a "cosey" for a couple of hours, and then boiled for a few minutes, and strained. The bitterness of the digested milk is almost completely covered in the peptonised milk-gruel; and invalids take this compound, if not with relish, without the least objection.

Peptonised Soups, Jellies, and Blanc-manges.—I have sought to give variety to peptonised dishes by preparing soups, jellies, and blanc-manges containing peptonised aliments. In this endeavour I have been assisted by a member of my family, who has succeeded beyond my expectations. She has been able to place on my table soups, jellies, and blanc-manges containing a large amount of digested starch and digested proteids, possessing excellent flavour, and which the most delicate palate could not accuse of having been tampered with. Soups were prepared in two ways. The first way was to add what cooks call "stock" to an equal quantity of peptonised gruel, or peptonised milk-gruel. A second and better way was to use peptonised gruel, which is quite thin and watery, instead of simple water, for the purpose of extracting shins of beef and other materials employed for the preparation of soup. Jellies were prepared simply by adding the due quantity of gelatine or isinglass to hot peptonised gruel, and flavouring the mixture according to taste. Blanc-manges were made by treating peptonised milk in the same way, and then adding cream. In preparing all these dishes it is absolutely necessary to complete the operation of peptonising the gruel or the milk even to the final boiling before adding the stiffening ingredient. For if pancreatic extract be allowed to act on the gelatin, the gelatin itself undergoes a process of digestion, and its power of setting on cooling is utterly abolished.

Peptonised Beef-Tea.—Half a pound of finely minced beef is mixed with a pint of water and twenty grains of bicarbonate of soda. This is simmered for an hour and half. When it has cooled down to about 140° Fahr. (60° C.), a tablespoonful of the

liquor pancreaticus is added. The mixture is then kept warm under a "cosey" for two hours, and occasionally shaken. At the end of this time the liquid portions are decanted and boiled for five minutes. Beef-tea prepared in this way is rich in peptone. It contains about 4·5 per cent. of organic residue, of which more than three-fourths consist of peptone, so that its nutritive value in regard to nitrogenised materials is about equivalent to that of milk. When seasoned with salt it is scarcely distinguishable in taste from ordinary beef-tea.

The extreme solubility of digested products—whether of starch or of proteids—detracts from their acceptability to the healthy. To them they appear thin and watery—they miss the sense of substance and solidity which is characteristic of their ordinary food. But to weak invalids without appetite this sense of substance or thickening is generally an objection, and they take with more ease an aliment which they can drink like water. The jellies and blanc-manges, on the other hand, give to invalids of more power that sense of resistance and solidity which is desired by those of stronger appetite.—*Medical Times and Gazette, May* 22. 1880, *p.* 550.

21.—ON A FORM OF DYSPEPSIA USUALLY ASSOCIATED WITH AN ALKALINE CONDITION OF THE URINE.

By Dr. C. H. Ralfe, Assistant-Physician to the London Hospital; Senior Physician to the Seamen's Hospital.

When human urine becomes alkaline it is due to one or other of the following conditions: 1. To excess of the alkaline carbonates of potash and soda; a condition that frequently occurs normally after the ingestion in large quantities of vegetables and fruits. 2. Excessive elimination of the phosphates of the alkaline and earthy bases under conditions that have not been yet thoroughly studied, but which are not unfrequently found preceding or even accompanying saccharine diabetes; or sometimes, as has recently been suggested, forming a distinct disease. 3. By the formation of ammonia in the urine from decomposition of urea. Now the reaction of healthy human urine collected throughout the twenty-four hours is acid, but if separate samples of the urine passed during this period be taken, considerable variations in the character of the reaction will be observed. The constancy with which these variations occur under different diurnal physiological conditions was first studied by Dr. Bence Jones. That physician pointed out that the acid reaction of the urine increases and diminishes inversely with the secretion of the gastric juice. He found by examining the urine at short intervals during the day that an increase of acidity was observed in the urines passed before meals, and

that a decline in the acidity occurred shortly after food had been taken, and acid was consequently withdrawn from the system; its maximum decline being attained in about three hours, when the acidity begins to rise. In some instances not merely was there depression of the acidity, but the urine became neutral and even alkaline. These observations of Dr. Bence Jones have been repeatedly confirmed by subsequent investigators; and the ebb and flow in the intensity of acid reaction of the urine, to which the term *alkaline tide* has been aptly applied, is a recognised physiological fact, though explanations different from that offered by Dr. Bence Jones have been advanced to account for the phenomenon. Dr. Roberts, for instance, is disposed to attribute the occurrence of the alkaline tide after meals to a different cause—namely, to the entrance of the newly digested food into the blood. For if, as he says, the normal alkalescence of the blood is due to the preponderance of alkaline bases in all our ordinary articles of food, a meal is *pro tanto* a dose of alkali, which must, for a time, add to the alkalescence of the system, and consequently of the urine. Dr. Bence Jones's view receives considerable support from clinical and physiological experience. Since in those cases attended with frequent vomiting of intensely acid fluid it has often been noticed that the urine passed immediately after the ejection of the fluid becomes alkaline; the same effect is produced in dogs experimentally when pounded glass or other indigestible substance is introduced into the stomach to provoke the secretion of the gastric juice, which is withdrawn as soon as secreted by washing out the stomach with water by means of a stomach-pump, showing in both instances that the alkalinity of the urine was caused by the withdrawal of acid from the stomach, and not by the addition of alkali to the blood. That the ingestion of food, especially vegetable food, contributes, in a slight degree, in the production of the alkaline tide is very probable, but that it is mainly concerned in the phenomenon is out of the question, otherwise the alkalinity of the urine would be in direct proportion to the quantity of food ingested, which is certainly not the case. Indeed, the acidity of the urine can be depressed, and even rendered highly alkaline, otherwise than by the withdrawal of acid from the stomach, or by the ingestion of food. And it is this circumstance, hitherto unexplained, that has rendered many physiologists unwilling to accept Dr. Bence Jones's as a complete solution of the phenomenon. Dr. Hermann Weber, some years ago, observed that whilst breakfast decidedly had an influence in lowering the acidity, yet when he went without that meal the acidity was still lessened, though not to so great a degree. This observation of Dr. Weber I have repeatedly been able to

confirm, the mere act of rising always producing a decided depression in the acidity of the urine. The use of the cold douche, or sweating in the vapour bath, both have the same effect, quite independently of food or the activity of the stomach.

There is another channel, however, by which acid is withdrawn from the blood besides the gastric secretion, and that is by the lungs. In the explanations hitherto advanced to account for the phenomenon of the alkaline tide in the urine this fact has not received attention. Dr. Edward Smith, in his researches "On the Elimination of Carbonic Acid," showed conclusively that the exhalation of carbonic acid by the lungs is increased by food and diminished by fasting, and that the amount exhaled during sleep is considerably less than is set free in the waking state. It therefore happens that the time when most carbonic acid is being exhaled corresponds with the time when observers have noticed a decided diminution in the acidity of the urine, whilst the circumstances that diminish the exhalation of carbonic acid—namely, sleep and fasting, are attended by a rise in the acidity of the urinary secretion.

In health, therefore, it is probable that the exhalation of carbonic acid, in conjunction with the withdrawal from the blood of acid for the gastric secretion, and the direct ingestion of alkaline bases, aid in producing the alkaline tide in the urine. In disease, however, circumstances may modify or reverse the action of one or other of the conditions, so that although the variations of the acidity of the urine are frequent and often intensely marked, no connection either between increased secretion of the gastric juice, the ingestion of food, or the exhalation of carbonic acid by the lungs can often be made out. Thus, for instance, in many pulmonary affections, in convalescence from many acute diseases, such as typhus, enteric fever, scarlet fever, pneumonia, &c., and in certain forms of dyspepsia, the urine remains persistently alkaline for many days together. The reason of this is not difficult of explanation, for in these diseases there is diminished supply of food and metamorphosis of tissue going on in the body, so that the salts which are concerned in maintaining the acidity of the urine are not separated to the same extent as in health. On the other hand, although from the feebleness with which the respiratory act is performed one would suppose that from less carbonic acid being exhaled by the lungs, the urine would maintain its acidity; yet it is not improbable that there being but rarely a temporary increase in its exhalation, in these cases, from the usual physiological stimulus of food and activity, the kidneys aid the lungs in getting rid of carbonic acid by separating it in its stable form (i.e., in combination with

alkaline bases in the form of carbonates of potash or soda). Whatever may be said against the hypothesis, it is a fact that these urines nearly invariably effervesce on the addition of dilute acid, thus indicating the presence of carbonates in the urine. Urine alkaline from the presence of fixed alkali has been generally attributed by writers on urinary pathology chiefly to excessive elimination of the alkaline phosphates, and slightly to those of the earthy; and no author, with the exception of Prout, has mentioned that the urine may be pathologically alkaline from the presence of the carbonates of potash and soda. Prout observes:—"There are several distinct forms of disease connected with derangements of the soluble alkalies in the urine independently of the phosphates." And he further observes in these cases, that "the earthy phosphates are rarely entirely absent, but their quantity seems to be below the standard quantity of health, while the quantity of soda, potash, and ammonia appears to be in excess, or, strictly speaking, the *carbonates* of these alkalies appear to be in excess, hence such urine generally effervesces strongly on the addition of an acid." Prout, however, did not distinguish in his observations between the alkalescence caused by the carbonates of soda and potash and that produced by volatile alkali, carbonate of ammonia. Of twelve cases which have come under my observation, in no instance was the alkalescence due to carbonate of ammonia. In four cases the carbonates of potash and soda were associated with considerable excess of the earthy phosphates—cases resembling in many respects those described by Dr. Tessier of Lyons as not unfrequently preceding or accompanying saccharine diabetes, or sometimes running a distinct course, and to which I hope to refer on some future occasion. Of the remaining eight cases the alkalescence of the urine was due entirely to the presence of the alkaline carbonates, the alkaline and earthy phosphates being either normal or diminished in quantity, and no trace of either carbonate or free ammonia being discoverable.—*Lancet, July* 17, 1880, *p.* 86.

22.—ON GLYCERINE IN FLATULENCE, ACIDITY, AND PYROSIS.

By Dr. Sydney Ringer and Dr. William Murrell.

An old gentleman, who for many years suffered from distressing acidity, read in a daily paper that glycerine added to milk prevents its turning sour, and he reasoned thus: "If glycerine prevents milk turning sour, why should it not prevent me turning sour?" and he resolved to try the efficacy of glycerine for his acidity. The success of his experiment was complete, and whenever tormented by his old malady he cures

himself by a recourse to glycerine. Indeed, he can now take articles of food from which he was previously compelled to abstain, provided always that he takes a drachm of glycerine immediately before, with, or directly after, his food. He recommended this treatment to many of his friends—sufferers like himself—and one of these mentioned the above circumstances to us.

We have since largely employed glycerine, and find it not only very useful in acidity, but also in flatulence and pyrosis, and that it sometimes relieves pain. We meet with cases where flatulence, or acidity, or pyrosis is the only symptom, but more frequently these symptoms are combined. Some patients rift up huge quantities of wind without any other symptoms than depression of spirits; in others we get flatulence and acidity, one or other predominating; and we meet with others who suffer from acidity, flatulence, and also pyrosis. In all these various forms we find glycerine useful, and in the great majority of cases very useful. We do not mean to say that in all cases it is superior to other remedies for these complaints; indeed, in several instances it has only partially succeeded, where other remedies at once cured. On the other hand, in some cases glycerine speedily and completely succeeded, where the commonly used remedies for acidity and flatulence completely failed. We do not pretend to estimate its relative value to other remedies; we are only anxious to draw attention to its virtues.

Gas is in some instances formed in the stomach, in others in the large intestine, in some patients in both. Our observations were made on stomach flatulence, and as glycerine is so readily absorbed we should hardly expect that it would influence the formation of wind in the colon, except given in large doses, and when it acts as a slight laxative, and so expels the putrefying mass which forms the wind.

In some cases it removes pain and vomiting, probably, like charcoal, by preventing the formation of acrid acids, which irritate delicate and irritable stomachs.

We suggest that it acts by retarding or preventing some forms of fermentation and of putrefaction. J. Mekulics shows that glycerine prevents putrefaction of nitrogenous substances, as of blood diluted with water, which speedily decomposes at the ordinary temperature of the air. Two per cent. of glycerine retarded decomposition for twenty-four hours; ten per cent. for five days. If the fluid were placed in the hatching oven, then two per cent. retarded decomposition for several hours, ten per cent. for forty-eight hours, and twenty per cent. altogether prevented putrefaction. He also proves that glycerine destroys bacteria and prevents the formation of septic poison, though it will dissolve and preserve the septic poison itself.

Dr. E. Murk finds that two to three per cent. will delay lactic fermentation in milk from eighteen to twenty-four hours.

Burnham Wilmot, 1860, says glycerine preserves meat so that after several months' immersion the meat is sweet and can be eaten; and Demarquay proves that both animal and vegetable substances may be kept for six weeks to two months by glycerine.

Glycerine, however, does not prevent the digestive action of pepsin and hydrochloric acid; hence, whilst it prevents the formation of wind and acidity, probably by checking fermentation, it in no way hinders digestion. We administer a drachm to two drachms either before, with, or immediately after food. It may be given in water, coffee, tea, or lemon and soda water. In tea and coffee it may replace sugar, a substance which greatly favours flatulence, as, indeed, does tea in many cases. In some instances a cure does not occur till the lapse of ten days or a fortnight.—*Lancet, July* 3, 1880, *p.* 6.

23.—INTESTINAL OBSTRUCTION EXISTING FOR NINE MONTHS, CURED BY COLO-PUNCTURE.

By Dr. John M'Gown, Millport.

The first symptom noticed was about the month of March. At that time the patient began to refuse his food, had slight diarrhœa, and the abdomen was somewhat tympanitic. He complained of no pain at this period, nor at any time during the whole course of the disease. The diarrhœa continued, more or less, during the nine months he was ill. Thinking the illness was owing to some slight derangement of the stomach, I tried all the medicines usually given in such cases—still the diarrhœa continued, and the distension of the abdomen increased. He still complained of no pain. He had no vomiting, unless when forced to take more food than he liked. The constant diarrhœa, and taking little food, produced great emaciation. A remarkable feature of the case was that, about five minutes after he took any food, a loud click-clicking sound was heard. The sound was such as can be produced by a quart bottle full of fluid being laid on its side, and allowed to empty itself in that way. The sound was produced by the fluid passing through the obstructed part, wherever that might be. The mechanical pressure of the gas on the kidneys and blood-vessels of the abdomen produced a whole train of peculiar symptoms. The legs became very œdematous three months after the disease was first noticed; and, at the end of nine months, they were greatly swollen, the skin blistered in several places, and fluid oozing from them. The heart's action was very feeble. The pulse had gone down to 40 in the minute.

No trace of albumen was found in the urine during the whole course of the disease. There was no difficulty of breathing, unless he attempted to exert himself in any way. The great pressure in the bowels produced a very large inguinal hernia on the left side. This could be easily reduced, but no truss could keep it up, on account of the great pressure. About the month of June, the disease now going on for five months, and having failed to relieve the distension, which was now very great, I passed the tube of the stomach pump up the descending colon for nearly two feet, and let off a large quantity of flatus. After the gas was let off, I injected a gallon of tepid water into the bowels through the long tube. I continued to do this every eight days for about two months; but latterly it required to be done every three or four days. I had great difficulty in introducing the tube at first, both on account of the unwillingness of the patient, and from the contraction of the sphincter ani; but, latterly, I introduced the rectum speculum first, and then passed the tube through it with the greatest ease to myself and the patient. During the month of August, I had the advice and assistance of several medical friends who were spending their holidays here. Dr. Kirk, of Partick, suggested that I should give the extract of belladonna a fair trial, which I did, without any good result. Opium had been given in large doses at an early stage of the disease, with a similar result. I now sought the advice of Professor Gairdner, of Glasgow, who came and saw the patient. He suggested my asking Dr. Cameron to see the case. Dr. Cameron and Dr. Grieve saw the case eight days after Dr. Gairdner. Dr. Cameron suggested puncturing the bowels; but, as I had been taught that that was a very dangerous operation, and one that should not be performed until all other things had failed, I did not consent to its being done. I was still able to partly relieve the distension with the long tube passed per anum.

In the British Medical Journal of Sept. 27, 1879, several cases of intestinal obstruction were published; and, as they had a direct bearing on my case, I read them very carefully. I was very much struck by what Dr. Goodhart said to his students in a lecture delivered at Guy's Hospital, when speaking about the operation of *colo-puncture*. Here are his own words, taken from the journal just referred to:—"You may perhaps think that some less hazardous means of relieving the distension than that of colotomy might be adopted, and another operation has been practised with that end in view—viz., paracentesis.

"The distension is due partly to gas and partly to fluid fæces; and it has been thought that, by withdrawing the former, the severity of the case might be relieved. One of the distended

coils has therefore been tapped by a fine trocar and canula, but there can be no doubt that this is an exceedingly dangerous thing to do; and I do not, from what I have seen and from what others have told, feel in the least inclined to recommend it to your notice. The danger is this, that the distension is, in the majority of cases, but little relieved; that alone is an objection fatal to its adoption. And the bowel remaining full, and its walls tightly stretched, fæcal matter, which you remember I told you is *always* liquid, leaks out into the peritoneum after the withdrawal of the canula from even the smallest puncture. I have myself seen this operation performed; and fæcal matter came out by the canula at once; no relief followed, and the patient died not long afterwards of acute peritonitis. So, do anything rather than this. You are taught, and quite correctly too, that small wounds of the intestine are comparatively dangerless, because the mucous membrane becomes everted, and so closes the aperture; but this only applies to a contracted intestine; but we are dealing with an over-full one. All the coats are, in such a case, distended probably to their utmost, the rugæ obliterated, and there is nothing to evert; and the smallest hole, under such circumstances, becomes a vent, and a vent, however small, in such a position, is fatal."

I called Dr. Cameron's attention to the articles published in this number of the Journal. After he had read them he told me he would come and see the patient, and do whatever might be considered best under the circumstances. Notwithstanding Dr. Goodhart's teaching, colo-puncture was agreed upon. The patient was placed on his back in bed, the position he always lay in since his illness. No chloroform was given, wisely I think, as you will hear shortly. Dr. Cameron thrust in the trocar and canula into the middle of the transverse colon; the gas blew off for a few minutes, and the bowel was about half emptied of gas, when the bowel was strongly drawn to the left side by its own peristaltic action; the canula was laid down on the walls of the abdomen, and liquid fæces began to escape from the canula. Dr. Cameron placed his thumb on the mouth of the canula, and then injected a small quantity of tepid water through the canula into the bowel. He now withdrew the canula, and placed a small piece of adhesive plaster over the wound, and we left the patient in bed. We did not consider the operation very successful, as the gas was only partly liberated.

But now comes the wonderful part of the case. Three hours after the operation the patient had a very copious discharge from the bowels of dark clayish liquid fæces, followed by a second, one hour after the first. Seven hours after the operation,

a large quantity of gas was passed per anum, and by next morning the abdomen was quite flat, and the distension completely gone. The kidneys now began to act vigorously. The ordinary chamber utensil was filled three times in sixteen hours; and, at the end of three days, all the œdema in the limbs had disappeared. The heart's action was now greatly increased; the pulse rose from 48 to 70 per minute. The patient has improved every day since the operation, and is gaining flesh rapidly. Wherever the strangulation existed, I am of opinion that the bowel liberated itself at the time of the operation. Had chloroform been given, the peristaltic action of the bowel might have been reduced, and the operation might not have terminated so well. Had this operation been delayed much longer, the patient could not have lived many days. I look upon the case as another of the triumphs of surgery; and should a similar case present itself to any of my medical brethren, I hope they will not hesitate to give their patient immediate relief, and the chance of complete recovery by the operation of colopuncture.—*Glasgow Medical Journal, June* 1880, *p.* 441.

24.—ON TWISTING OF THE INTESTINE AS A CAUSE OF OBSTRUCTION.

By Dr. Joseph Coats, Editor of the Glasgow Med. Journal.

The reading of the preceding paper, by Dr. M'Gown, in the Glasgow Medico-Chirurgical Society, in which a very peculiar case of intestinal obstruction is described, has suggested the following remarks. I believe that in the minds of medical men the possibility of twisting is seldom present as a cause of intestinal obstruction, and that mention is made, in a vague way, of "bridles of lymph," "adhesions," and such like, much more frequently than actual observation in the *post-mortem* room warrants.

Twisting of the gut is most frequent in the sigmoid flexure, and the explanation of this is to be found in the anatomical relations of this portion of the intestine. It will be remembered that the upper and lower ends of the sigmoid flexure are firmly fixed against the posterior and lateral wall of the abdomen, and that these two extremities are attached close to each other. The flexure itself passes out from its upper attachment, and returns nearly to the same place, forming a loop with a comparatively narrow neck. It will be easily understood that a loop with such relations will get more readily twisted than in situations where the extremities of the loop are distant, and at the same time freely movable. It will also be understood that, if a loop of intestine becomes altered in its relations in such a way as to approximate to the sigmoid flexure in the above men-

tioned regards, it will become much more liable to twisting than it was. This will be illustrated in the second of the cases about to be related. It will further be apparent that an obstruction due to twisting will be, as a rule, much more readily resolved than one due to such causes as internal strangulation, obstruction by tumours, &c., and perhaps this is the reason that this form of obstruction is so seldom taken into account, *post-mortem* examination revealing it in a much less proportion of cases than it actually occurs in. The cases about to be related may, in this view of it, be regarded as all the more important.

The first case was one of twisting of the sigmoid flexure, and to Dr. Yellowlees I am indebted for the opportunity of examining the parts, as the patient was an inmate of Gartnavel Asylum.

The patient was a demented old man, from whom it was impossible to get a good account of his illness. It was ascertained, however, that, on two previous occasions, he had complained of obstruction of the intestine, from which he recovered, and that this attack, from which he died, was the third. It could not be ascertained when the bowels were last moved, but he began to complain of uneasiness and pain in the abdomen about a week before death. There was no vomiting throughout, and the most prominent symptom was an enormous flatulent distention of the abdomen. For this, colo-puncture was twice performed, but without apparent relief; injections were given per anum, but they came away with very little fæcal matter.

At the *post-mortem* examination, the distension of the abdomen was exceedingly striking. On laying open the abdomen the distension was seen to have been produced almost entirely by the extraordinary dilatation of a single loop of intestine which was found to be the sigmoid flexure. It is difficult to convey a due impression of the amount of dilatation of this portion of gut. It seemed to fill the abdomen, and its diameter was not less than that of a well developed thigh. The course of the bowel was most readily traced from the rectum upwards, and this limb of the loop passed right up into the left hypochondre. Here it made a sharp bend, and returned still much dilated. At its lower extremity this limb twisted round the other and then passed backwards to become continuous, in the normal way, with the descending colon, which was in its usual position. The great distension of the flexure had dragged the rectum greatly upwards. This, of itself, considerably narrowed its calibre, which was still more obstructed, but not completely so, by the twisting of the intestine round it. It is to be here particularly observed that the actual twisting involved mainly the upper limb of the loop, so that a tube might have been passed upwards into the sigmoid flexure without meeting any

serious obstruction, except by the pressure of the portion of intestine passing round the neck. It was found comparatively easy to untwist the flexure, and it was thus more definitely made out that it had twisted on itself, making two half turns. At the point of twisting the gut was considerably narrowed, especially at the lower extremity, where the sigmoid flexure passes into the rectum, and here there was some thickening of the peritoneum; but, after untwisting, water passed freely through the narrowest part.

Further comment on this case is hardly necessary; but I may be allowed to observe, in relation to Dr. M'Gown's case, that the condition of parts offers an explanation of how the relief of the flatulent distension, by means of a rectal tube, might have been unsuccessful, while its relief by colo-puncture might have succeeded. A tube passed upwards, by holding the intestine in position, might actually prevent untwisting during the collapse, while a relief of the distension by puncture from above would in no way interfere with it.

The next case is one in which the existence of twisting is rather inferred than actually demonstrable. In relation to it, also, a somewhat interesting obstetrical question comes up—namely, the association of pelvic abscess with intestinal obstruction. In this view of it, and with the kind assistance of Dr. W. L. Reid, the history of the case will be more fully detailed.

The patient was a healthy woman, married at 31, and confined, naturally, of her first child, a boy, about a year after marriage. Exactly two years afterwards, on Jan. 3, 1876, she was confined of a second boy, and this, also, was a natural labour. On the third day, fear of an accident to one of her children caused her to get up suddenly and cross the lobby in her night dress; she remained for some time in this condition, and immediately after returning to bed was seized with a rigor, followed by high fever. This was succeeded by signs of pelvic inflammation of such a serious character as to cause delirium; but it was only after about three weeks that the presence of pus was detected above Poupart's ligament on the right side. Pus was withdrawn by the aspirator at intervals of two to three days, the quantity removed on each occasion varying from 3 to 6 oz. This treatment lasted some seven weeks, and in all, about 80 ounces were withdrawn. Most of the punctures were made above Poupart's ligament, but the last few below it and towards the inside of the thigh. Ultimately, the little pus that remained was absorbed. Recovery was slow, and there was, especially, prolonged incapacity of the right leg; but by the beginning of autumn she was able to walk about

slowly. Menstruation was resumed about July of the same year, and continued till her last illness.

During the next four years she enjoyed good health, but is stated to have suffered occasionally from constipation of the bowels, accompanied by considerable pain, but these attacks were overcome by the aid of ordinary purgatives, without medical advice being sought.

On Dec. 31, 1879, Dr. Reid was sent for, and found that she had been suffering from constipation for several days, which had been accompanied by pain, from the 29th. The abdomen was considerably swelled and tympanitic, but not acutely tender. The constipation continued for rather more than a week, accompanied, during the last four days, by stercoraceous vomiting, but never with extreme abdominal tenderness, or great constitutional depression, the temperature never rising to 101° F. At this period, Professor Gairdner saw the patient on two occasions, and, in view of a possible connection of the constipation with the old pelvic abscess, Dr. Matthews Duncan was communicated with. After continuing for about eight days, the constipation was relieved on the use of large and frequently repeated enemata. For the next three days she seemed to improve as rapidly as could be expected, and then she suddenly became insane. After remaining more or less maniacal for five days, she was removed to Gartnavel, where she continued somewhat violent till three days before death, which occurred twenty days after her admission. Death was preceded for two days by signs of peritonitis, which at one time relaxed considerably, so that, at the last, the fatal issue was somewhat sudden.

Considerable interest was excited to determine what connection might exist between pelvic cellulitis and intestinal obstruction.

The *post-mortem* examination revealed, in the first place, a general acute peritonitis. On searching for the cause of the former obstruction of the bowel, attention was soon directed to a loop of intestine, which presented a remarkably dark colour, and which turned out to be the last part of the ileum. On examination, it appeared that the pelvic cellulitis had extended upwards from the pelvis into the abdomen, and had caused considerable thickening and condensation of the peritoneum and mesentery, especially in the neighbourhood of the pelvis. By this inflammatory process, the loop of ileum already referred to had become fixed, at its upper end, to the posterior wall of the abdomen, close to the cœcum; and in this way the upper extremity of the loop was brought close to the lower extremity, and rendered immobile there. It is to be observed, further, that, as the cœcum has no mesentery, the lower extremity of

the ileum is comparatively fixed at its termination in the cœcum. The loop of intestine concerned was thus brought into a condition somewhat similar to that of the sigmoid flexure, in respect that its two extremities were brought near together, and rendered immobile. Under these circumstances, it is probable that this loop of intestine, which had undoubtedly been partially strangulated, had been the seat of twisting—and, indeed, at the *post-mortem* the loop still presented a slight twist.

On opening up this loop of intestine, it was seen that, at the upper and lower extremities, but especially at the upper, a partial separation of the loop was taking place. At the upper extremity a deep line of separation existed, which penetrated through the mucous membrane, at one part even through the peritoneum, where a slight perforation had occurred, doubtless the cause of the acute peritonitis. The line of separation at the lower extremity—that is, immediately above the valve, was not so deep, but it penetrated through the entire thickness of the mucous membrane. It is to be added, that the tissues of the pelvis were found greatly matted together; the Fallopian tubes were bound down along the posterior and lateral walls of the uterus, and the ovaries buried in thickened tissue, so that it was difficult to make out the relation of parts.

No constricting band or other cause of strangulation was discovered.—*Glasgow Medical Journal, June* 1880, *p.* 444.

DISEASES OF THE URINARY ORGANS.

25.—ON THE TREATMENT OF BRIGHT'S DISEASE, AND THE USE OF DIURETIC REMEDIES.

By Dr. W. T. Gairdner, Professor of Medicine in the University of Glasgow.

Notwithstanding the numerous and valuable contributions of late years, at home and abroad, to the science and literature of Bright's disease, and the really considerable advances made, and still being made, in the pathology of those renal affections that make up the group so called, it cannot be affirmed, even by the most sanguine therapeutist, that the treatment of the disease has advanced in anything like a proportionate degree, since the time when the great English physician who, from 1827 to 1843, occupied the fore front of the whole field of inquiry ceased to take an active share in the controversies which resulted from his own discoveries.

I am of opinion that the impetus given to pathology by Bright's great discoveries had, in some respects, an unfavourable influence on the medical treatment of dropsies, especially in London and in England; but more or less all over the world.

The mere idea that the kidney was unsound, still more that it was inflamed, was sufficient, with Bright himself and all his immediate followers, to beget an apparent unwillingness to employ diuretics at all; and certainly also a very great comparative bias towards purgative practice as opposed to diuretic, from the fear of increasing the albuminuria through the latter. That Bright did not altogether forbid the use of diuretics, I freely grant; and that he preferred the saline diuretics in some cases, according to the rule of Dr. Blackall, is also evident; but his use of them was timid and hesitating as compared with his employment of drastics, and even of blood-letting, and that of his followers still more so. And without going into details more than is necessary, I think it may be generally affirmed that in all the works of most considerable reputation produced in the London school, almost without exception, or at least with the one exception of Dr. Dickenson's, there has continued to be, down to almost the present hour, a lingering prejudice that it is much better practice even to excoriate the bowels from day to day by the most drastic hydragogues, than to use habitually even the mildest diuretics, on the ground stated or implied, that the kidney is the tender and wounded part, which *needs to be kept as much as possible at rest*, just like a wounded limb or an inflamed lung.

I venture to affirm that my experience entirely corroborates the early statements of Dr. Christison, *that when the more mild saline diuretics can be brought to act at all* in renal disease, they by no means tend to increase, but rather greatly to diminish, the proportion of albumen in the urine; and that at the same time the specific gravity (as indicating the urea and salts) is, in recent cases especially, *relatively* increased as compared with the quantity; or, in other words, as quantity increases and albumen diminishes, the total excretion of the normal solids (urea, salts, &c.) in 24 hours is notably increased. Even when such diuretics fail to act, however (perhaps in some cases from not being absorbed), or when they act in the first instance as purgatives, they do no harm, according to my experience; and, on the other hand, they are often greatly assisted in acting as diuretics by a previous and temporary phase of action (either alone or in combination) as purgatives. Hence the association, long in such favour in Edinburgh, of cream of tartar with jalap, or with gamboge, in renal cases, my own practice being usually to give the compound jalap powder in doses of gr. x-xxx every few hours until purgation is established, which is followed up by cream of tartar solid, in electuary, in gr. xx doses, and finally, when diuresis occurs, as often happens in a few hours, it is kept up by the cream of tartar in solution given alone, or with orange or lemon peel (imperial drink).

indefinitely, and with the happiest results. I think it is not too much to say that I have never seen any injurious result whatever follow from this mode of treatment, if watched with ordinary care. I therefore much prefer it on the whole to the treatment by digitalis, or by any vegetable diuretic, which might, under certain circumstances, prove poisonous if long continued; and I need not say how much I prefer it to continuous drastic purgation, however accomplished, in a class of cases so often tending to death by exhaustion.

Dr. George Johnson in his later works, Dr. Dickinson, and others, insist much on the occurrence of *spontaneous* diuresis in Bright's disease as one of the incidents of recovery from renal dropsy; the inference being that it will occur under any treatment. This fact was not unknown to the earlier observers, and has long been known to me; but, I claim it as one of the best arguments in favour of the diuretic practice, not only in the chronic, but also in the acute and subacute forms of renal dropsy. The theory of such spontaneous crisis may admit of a good deal of discussion as a pathological question; but surely the fact of a movement towards cure being shown forth in this way, rather than in another, spontaneously, should tend to raise a presumption in favour of, rather than against, the attempt to imitate nature by simple processes closely allied to her own. It is, of course, difficult to prove, in any particular case, that the crisis apparently brought about by diuretics was *not* spontaneous; but from the practical point of view it is of no great consequence, and in a large number of cases carefully watched, it is impossible, I think, not to gain a positive conviction, that the remedies have in a considerable proportion contributed notably to the result. In fact, I am pretty sure, from my own observations as well as from the recorded facts in renal dropsies, that almost any kind of evacuant remedy, from blood-letting to purging, and from the latter to diaphoresis, will often bring about a diuretic crisis; and it is precisely this conviction that has led me to employ other artificial evacuations, in certain urgent or obstinate cases, simply as preliminary remedies, leading up, as soon as possible, to the much safer, because more natural, use of diuretics.

A consideration urged by Dr. Dickinson is not without a bearing on this subject. It is the basis of his recommendation of large draughts of cold water in renal dropsy. The obstructed tubuli uriniferi need flushing—they must therefore have an abundant supply of fluid to the blood to do this work. I have no objection to urge to this theory, nor do I unreservedly adopt it; but I desire to note that it logically includes, or connotes, a more or less complete abandonment, by this able English physician, of the fundamental idea, or prejudice, which was

allowed, as I think, an undue influence in English practice, tending, as we have seen, to discountenance the use of diuretics in Bright's disease. Turning in a stream of water upon the kidney (if it could be thus artificially accomplished) is no more giving it physiological rest than would be the administration of mild diuretics.

Dr. Dickinson's idea, however, must be regarded as in a very decided sense a protest against an extreme purgative or diaphoretic practice, even if it should not be considered to countenance active saline diuretics. On the other hand, Dr. G. Johnson argues, in view of this objection to diaphoretics, that external warmth and diaphoresis, by relieving renal congestion, will allow of the spontaneous diuresis, secondarily occurring, which is required by the theory. You see how difficult it is to get rid of embarrassing speculations in a subject of this kind. It is better for us, on the whole, to rest on established facts.

I am, however, by no means unfavourable to diaphoresis, and have, especially of late, since reading Bartels' articles, begun to employ it again more freely than formerly. As yet I am obliged to confess that the resources of our hospitals do not, at present, give us such command of diaphoretic methods as to convince me of their power to supersede all others. I have long thought of, and have not rarely employed, in private cases, the Turkish bath, with fair results on the whole, but it is only in a few cases that either from this or from the ordinary vapour or hot air baths, I have been able to observe such unequivocal results as to induce me long or steadily to persevere with them. In a few more recent cases I have used pilocarpine injections every second day, of from $\frac{1}{8}$ to $\frac{1}{4}$ grain; and as some of these cases were very decidedly benefited, after all other remedies had been resisted, it is only fair to presume that further good results may be obtained.

In uræmic cases generally I still prefer the old method of purgation by very active hydragogues to any other evacuation, partly on account of the well known experiments of Bernard and Barreswil, which show that in animals in whom the kidneys have been extirpated, a quasi-vicarious elimination of carbonate of ammonia takes place into the alimentary canal, with the result apparently of prolonging life. In these cases, however, and in others of like urgency, I am by no means wholly averse to the use of blood-letting, which, as I have already said, appears to have, in favour of its primary good results, an amount of evidence more overwhelming than can be presented on behalf of any other remedy.

Finally, and to put into a single sentence the main object of this paper:—I by no means claim to have discussed at all completely the treatment of Bright's disease, nor have I even alluded

to several remedies—*e. g.*, gallic acid, benzoic acid, fuchsin, of which I have made personal trial, with various results. But I hope to have shown, once for all, that in almost all stages of the disease there has been an undue tendency to depreciate or exclude diuretic remedies, and that these, judiciously employed, without pretending to an absolute supremacy, are at once the safest, and in many cases the most effectual of the means of dealing with dropsical symptoms, while, as Dr. Christison has pointed out, their legitimate function is not merely to get rid of a single symptom, but by aiding the natural process of excretion by the kidneys, to ward off the dangerous accumulations in the blood, which lead in time to what is called uræmia. To restore by remedies this natural function, we must needs employ, in any case, methods of elimination that are more or less closely allied in their action to the physiological processes which it is desired to arouse and quicken; and hence, as I venture still to be of opinion, the experience of ages, here quite in accordance with a sound theory, has practically demonstrated the advantage of employing in such cases the cream of tartar in its solid as well as liquid forms of administration, followed or accompanied by other mild diuretics, or by digitalis; a mode of practice extending back, as we have seen, to the last century, if not to much earlier periods, and only apparently discredited by prejudices arising from the pathological researches of Bright. My argument in this paper is that the principle of this practice, or the practice itself, ought to be carefully maintained, or restored again more generally, in the treatment of this disease. As to the employment of tonics, nutrients, chalybeates, and other hæmatics in the later stages, there is practically an universal consensus of opinion.—*Glasgow Med. Jour.*, *Sept.* 1880, *p.* 177.

26.—ON THE USE OF ERGOT IN DIABETES MELLITUS.

By Dr. Joseph W. Hunt, Physician to the Wolverhampton and Staffordshire General Hospital.

Till but a few days back I fondly imagined that I should be the first to recommend to the profession the use of ergot as a more or less successful mode of treating certain forms of diabetes. I have however found that Dr. Pepper of Philadelphia advocates its use, though he does this more for the relief of a symptom, profuse diuresis, than as the main feature in the treatment of the disease. It is very possible too that others may have reported cases treated by the same drug, though these have escaped my notice; while undoubtedly many must have tried it, even if they have not reported their results, since its great value in diabetes insipidus and its well-known action in causing a contraction of the arterio-capillary vessels must have

led to its adoption by those who consider diabetes to depend primarily on some disorder of the vaso-motor system.

Thos. A., æt. 40, married, an engine fitter, was admitted as an in-patient under my care, March 27, 1880. With the exception of sixteen weeks' illness, said to be "consumption," when he was fourteen years old, he had enjoyed good health till the last few years. Lately he had suffered from chronic bronchitis, which he attributed to his working in a steam shed. A paternal aunt died of phthisis, and his eldest daughter suffers from severe epileptic fits. No other phthisical or neurotic history could be obtained. He had always been a moderate drinker, but last Christmas Eve he drank much more than his wont, especially of spirits, and was "quite drunk." On the following day there was a sudden onset of marked thirst, accompanied by profuse diuresis. These symptoms increased, and he very rapidly lost weight. He was seen by an experienced medical man, who recognised the nature and gravity of the case, and by whom he was placed on a most judiciously selected diet, notwithstanding which he continued, though more slowly, to retrograde, passing, according to his own account, about three quarts of water in the twenty-four hours, and drinking much the same amount of fluids.

On admission he appeared to be a well built man, with evident marks of having emaciated considerably. His expression was anxious. Skin slightly moist, non-febrile. No general or local œdema. No enlarged glands. Gums spongy, and bled readily; teeth loose, and breath offensive. Appetite good. Thirst very marked. Tongue broad, pale, moist, indented with teeth, and covered with whitish fur. Bowels constipated. An examination of the chest showed a marked tendency to emphysema, while at each apex, especially the right, the percussion note was slightly deficient. At each apex the breath sounds were divided and harsh, with prolonged expiration, and at the right apex was heard an occasional sonorous *râle*, most marked with expiration. The heart was normal. Pulse 80, small and compressible. Abdomen normal. Optic discs normal. Sight good. The urine of a clear amber colour, acid, sp. gr. 1046. It contained a very large amount of sugar, and no albumen. He passed in the first twenty-four hours 76 ounces of water, but this, he said, was much below the normal amount. Weight, 9 stone 13 lbs.

March 29. I saw him on my usual round and ordered him, Ext. Ergotæ Liquid. ℥ j ter; and in order that this treatment might have a fair trial and be uncomplicated with other favourable conditions, I ordered him a full and liberal diet with plenty of starchy food. No sugar was allowed, but he was told he

might have what else he liked, and having been for some time on a restricted diet, he gladly availed himself of the permission.

April 2. Passed 60 ounces of urine, sp. gr. 1042. Ergot increased to ʒ iss.

April 8. Passed 42 ounces, sp. gr. 1035. His general condition had much improved. All thirst had gone, and he told me with much pleasure that he had been ten hours without anything to drink. Though he got up twice at night to pass water, he was able to hold it much longer. Weight, 10 stone. He was now strictly dieted, being ordered 4 ounces of cooked meat three times a day, 2 pints of ordinary beef-tea, 1 pint of milk, 1 lb. of green vegetables, and some gluten bread; to take nothing else.

April 14. Patient continued to improve, though he occasionally suffered severely from dyspepsia. His diet was reduced to a chop for lunch, and 2 ounces of meat twice a day with ½ lb. of vegetables; the liquids as before. As he very much disliked the gluten bread it was omitted, and he was allowed in its place about 2 ounces of very well-toasted thin slices of bread. Urine 38 ounces, sp. gr. 1026. For the last two weeks he had taken a considerable amount of walking exercise, and also assisted in more laborious employment, such as rolling the tennis lawn, but it always seemed to me as if exercise was not so advantageous to him as it frequently is to many other diabetics.

April 21. Urine 38 ounces, sp. gr. 1020. The amount of sugar is very small, and only reduced after boiling some time with Fehling's solution and then standing some time.

April 25. Rep. mixt. 4tis horis.

April 26. Urine 45 ounces, sp. gr. 1021. No trace of sugar even after prolonged boiling and waiting some time. He still suffered much from dyspepsia, for which he was ordered nightly a pill containing belladonna, nux vomica, and aloes.

May 7. Weight 10 stone 2 lbs. Since last note his urine has varied in quantity from 41 to 48 ounces, with a sp. gr. of from 1015 to 1022. Occasionally a little sugar is present.

In the case of another patient who came under my care towards the close of 1878 with the history of twelve months' illness, of which the most prominent symptoms were excessive thirst, profuse diuresis and progressive weakness, and a loss in weight of 4 stones, almost equally satisfactory results were obtained. Under a free meat diet and the use of ergot his urine diminished in quantity from 118 ounces to between 40 and 50, and the sp. gr. from 1040 to between 1022 and 1028, and for a time sugar entirely disappeared. It however subsequently was discoverable in small quantities, and since his discharge whenever he has come under my notice some has

always been present. On the whole, however, his general condition has been most satisfactory, and whenever he feels out of sorts he comes to my out-patient room for a little more of the medicine that did him so much good before.—*Practitioner*, *Sept.* 1880, *p.* 170.

SURGERY.

FRACTURES, DISLOCATIONS, AMPUTATIONS, AND DISEASES OF BONES, JOINTS, ETC.

27.—ON ANTISEPTIC EXCISION OF THE KNEE-JOINT.

By CHARLES COPPINGER, Esq., Surgeon to the Mater Misericordiæ Hospital, Dublin.

As the recent discussion on the antiseptic treatment of wounds, and the statistics on the subject which have lately been brought before the profession, cannot fail to modify the practice of many surgeons who have not hitherto adopted that method in its entirety, the following remarks on excision of the knee-joint will not be just now without interest.

The number of splints and appliances which have been devised for use after this operation is sufficient evidence of the difficulty experienced by surgeons in maintaining a proper position of the limb during the somewhat long convalescence which follows it, and this task is now rendered still more difficult, and our choice of a suitable apparatus much restricted, by the necessity for free access to the wound which Mr. Lister's system of dressing requires.

On the other hand, this method of treatment offers peculiar advantages after such a procedure as excision of the knee—an operation by which large, freshly-divided bone surfaces are exposed in a granulating wound in communication with the air, and by which the patient is usually subjected for many months to the danger of septic infection—a danger which, moreover, in these cases, is much increased by the almost unavoidable occurrence of slight movements between the divided ends of the bones, by which perfect rest in the wound is interfered with. In the absence of antiseptic dressings such movements always exert a most injurious influence on the progress of the case. In the first place, by displacing and wounding the newly-formed tissue, by which repair is accomplished, they directly interfere with the reparative process itself; while, secondly, they favour the absorption of septic material, by causing rupture of the delicate granulation film, to which Mr. Savory has lately prominently alluded, and on which he so much depends, as a natural safeguard against infection. Whether or not this be a correct explanation of the

manner in which disturbances of the wound affect the patient's general condition, the fact remains; and a rather large experience of this operation during the last ten years has convinced me that it is impossible to exaggerate the injurious effect, in some manner produced, by even slight movements of the bones or displacement of the deeper portions of the wound. I have repeatedly verified the bad effect of such disturbances by the evidence of the patient's condition derivable from the pulse and temperature chart, even where no annoyance or pain was referred to the seat of the wound, and I have witnessed the failure of the operation in cases in which the surgeon's efforts to prevent this motion by an apparatus had been unsuccessful, and in which continuous slight disturbances had maintained a permanent derangement of the patient's temperature and nutrition.

From these considerations it follows that, during convalescence after this operation, the seat of the wound should be most carefully kept at rest by the use of a reliable apparatus, and that the bad effects of accidental motion should be as much as possible lessened, and the danger of septic infection otherwise prevented by strict adherence to the details of antiseptic treatment.

We now come to the practical question—What apparatus will secure us, as far as possible, against the evil effects of motion in the wound, and, at the same time, allow the convenient application of the above-mentioned method of treatment?

The splints of which we have had experience at the Mater Misericordiæ Hospital fairly represent the different views of surgeons on this subject. They include the modification of M'Intyre's apparatus devised by Mr. Price, the box-splint of Mr. Butcher, the plaster-of-Paris appliance of Mr. Patrick Heron Watson, and the gypsum apparatus recommended by my colleague, Mr. Hayes.

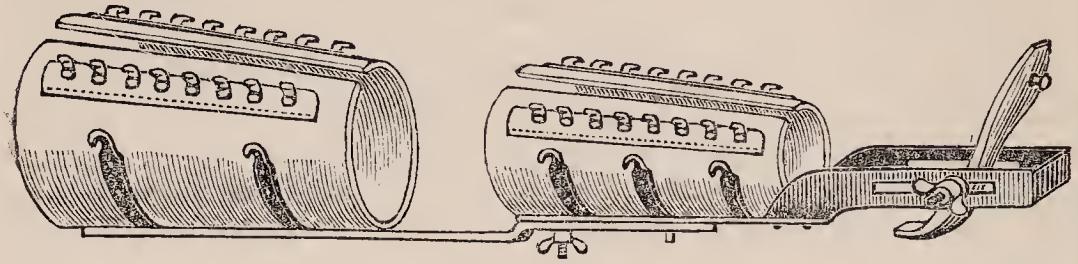
Mr. Hayes' splint, which was described some years ago in this Journal, (see *Retrospect*, Vol. 73, p. 146,) and which has since been modified by him, was the only one of these which, from its construction, offered facilities for the application of Professor Lister's dressings, and it was accordingly used by me in an excision of the knee, which was performed in May 1876, under carbolic spray and with full antiseptic precautions. In this case, unfortunately, the gypsum in the neighbourhood of the wound was prevented from setting by frequent dressings under spray, rendered necessary by an unusually large quantity of serous discharge following the operation, and it was for that reason found impossible to maintain aseptism in the wound. Now, this disadvantage, common to every description of plaster-of-Paris apparatus, can no doubt be avoided by deferring the

application of the splint until the profuse discharge of serum and blood caused by the irritant action of the carbolic acid, and which immediately follows the operation, has ceased, and until the danger of reactionary or secondary bleeding has passed away; but this course has the manifest disadvantage of entailing on the exhausted patient a second operation which usually requires anæsthesia, and which is often almost as severe and protracted as the original procedure. It is, moreover, unnecessary, if careful attention be paid to the prevention of hemorrhage, and if a suitable apparatus be made use of. Surgeons are induced to adopt this course on account solely of the difficulty of readjusting a gypsum apparatus when it has once set, but this circumstance seems rather to afford an argument against the use of the so-called immovable apparatus than furnish one in favour of a practice otherwise so objectionable. Again, this or any form of fixed or immovable splint has for our present purpose a great disadvantage in containing no provision to meet the change in size which the limb undergoes subsequent to the operation, and great skill is consequently required in its application to enable us to strike the happy mean between a splint too tight to allow space for inflammatory swelling and a loosely fitting apparatus, which will prove altogether useless at a later period when inflammatory enlargement has given place to muscular atrophy and contraction.

In some patients, more especially in children and in those in whom the joint degeneration is preceded or accompanied by osteitis, the wasting of muscular structures in the limb has already taken place, and the only subsequent alteration which occurs in its size is the enlargement in the immediate vicinity of the wound; but as a general rule this operation is followed by a considerable diminution in the size of the limb. In muscular adults with languid circulation it is on this account often impossible to apply a gypsum case in such a manner as to allow proper blood supply to the wound, and at the same time with sufficient tightness to make allowance for subsequent atrophy in the muscles of the thigh and leg. In last February the operation was performed by me on a patient of this class, and I was obliged to amputate the limb; for considerable swelling and œdema occurred in the neighbourhood of the wound, which necessitated such a free division of the plaster case that it finally became useless, and although it was removed and reapplied, it was found in the end impossible to preserve the leg.

Since that date I have made use of the apparatus represented in the accompanying woodcut in three cases of excision of the knee-joint; and experience of this new splint has satisfied me that it is as firm as the gypsum apparatus, far more easy to apply and remove, that it is not injuriously affected by carbolic

spray, and, above all, that it can be tightened or the reverse when necessary.



It consists of a posterior bar of polished iron, as in Mr. Hayes' splint, reaching along the thigh and leg, and constructed of two parts, arranged to slide along one another, and clamped together by a screw. To this posterior bar, which is rectangular on section, strong, and rigid, are attached, at intervals, pieces of soft sheet-iron long enough to half encircle the limb. Two pieces of poroplastic material, enclosing the thigh and leg respectively, are riveted to these bands, and are provided with hooks similar to those used by bootmakers, by means of which the splint can be securely laced on to the limb. To the leg or distal end of the posterior bar a foot-piece is attached of the same description as that of the iron splint known as M'Intyre's, and secured by a screw, as in that splint.

It will be noticed, on referring to the illustration, that in the neighbourhood of the wound this apparatus, when applied, presents simply the posterior flat bar of iron, by which alone the thigh and leg portions of the splint are connected, and which is itself removed some distance from the popliteal skin. There is thus no difficulty in the application of the antiseptic dressings, while any swelling, or accumulation of matter in the popliteal space, is open to inspection.

The following is the method of applying the splint:—When the operation has concluded and hemorrhage been arrested, by ligatures or otherwise, a piece of "protective" is placed along the wound, and the limb carefully adjusted in the splint, which has previously been heated or dipped into hot water to render the poroplastic felt flexible. A small separate piece of softened felt is now applied along the front of the thigh so as to act as a tongue, and the plastic material moulded, by pressure, to the limb. The soft iron hoops, of course, yield when pressed upon, so that, when the leg and thigh portions of the splint are drawn together by laces, the limb is most securely held by the apparatus. The protective is then removed under spray, short drainage tubes are placed at each angle of the wound, and wire or carbolised sutures tied along its margins. The gauze dressing should be applied so as to encircle the limb, but not to in-

clude the posterior bar. The foot-piece is set at a proper angle, and, when the patient has been placed in bed, the whole apparatus is slung from a strong cradle by means of cords attached to the extremities of the flat hoops of iron, by which the felt is encircled. All danger of the absorption of discharges by the poroplastic material is prevented by the fact that it is situated some distance from the line of incision, and not beneath it, and by the surgeon's adopting the precaution of painting the apparatus over with a thin coat of melting paraffin wax, in which crystals of thymol or of carbolic acid have been dissolved.

As it is often advisable to leave the splint without removal for two or three months, care should be taken in the choice of soft and well-fitting pads, which previous to use should be dipped in a hot saturated solution of boracic acid and thoroughly dried. After this treatment they will be found covered with fine crystals of the acid, the mechanical effect of which is similar to that of powdered French chalk in preventing wrinkling, &c.; while by this means the danger of decomposition or of the entrance of pediculi under the splint is effectually prevented.

The form of drainage tube suitable in these cases, and indeed, most useful in many wounds over which carbolic gauze dressings are applied, is represented in the accompanying woodcut, and consists of the usual perforated India-rubber, with a broad flange of the same material at one end attached either obliquely or at a right angle with the axis of the tube.

The obliquely flanged drain is that most generally useful, and will be found especially convenient in securing drainage of the pleural cavity.

These tubes are constructed of the best description of rubber, as recommended by Mr. Lister, and they are quite reliable in this respect, for the very good reason that they cannot be constructed of the impure or vulcanised material. They can be cut to any length, and can be easily inserted by means of a probe notched at the end, as shown in the woodcut. By the use of these drains, which I devised some years ago, and of which I have had a large quantity constructed, the annoyance, caused by the slipping of the ordinary drainage tube altogether into an abscess or wound, is avoided. This is, of course, but a small evil when it occurs with the Neuber drainage-tube of decalcified bone, as indeed it is very liable to do, but the matter be-

comes rather serious when a rubber tube meets a similar fate, and is perhaps destined to remain (as in a case which I lately heard of) in the patient's pleural cavity as a permanent relic of a former operation.

These drainage tubes are now to be had of all sizes from Messrs. Fannin & Co., of Grafton Street, and from Mr. Whyte, Sackville Street, Dublin.—*Dublin Journal of Medical Science, July* 1880, *p.* 1.

28.—ON THE EMPLOYMENT OF DOUBLE EXTENSION IN CASES OF DISEASE AND INJURIES OF THE SPINE AND PELVIC JOINTS.

By John Wood, Esq., F.R.S., Professor of Clinical Surgery, King's College; Senior Surgeon to King's College Hospital.

The usefulness of the principle of extension in diseases of the joints, and especially those of the lower extremities, is so generally recognised by surgical authorities at the present time, that anything more than a summary of the benefits derived from it would be superfluous for our present purpose.

I have long been in the habit of treating *hip-joint disease* by extension by Gurdon Buck's plan of the stirrup applied by adhesive plaister; the counter-extension being obtained by raising the foot of the patient's bed upon two bricks or wooden blocks, so as to bring into play the centre of gravity of the patient's trunk, acting on the reversed inclined plane, in a direction opposite to the extending weights attached to the leg. I had for some time observed, however, the disadvantage resulting from the one-sided action of the extending force in causing or increasing the obliquity of the pelvis, and, through it, acting unequally upon the muscles and ligaments of the spine. In my efforts to obliterate the forward lumbar curve, which is the invariable result of ordinary coxalgia or hip-joint disease, I found that, by the use of the bed-sheet fastened to the bedstead across the abdomen, the antero-posterior curve (caused by the contraction of the psoas muscle) frequently became a lateral curve from the action of this muscle on the affected side, exaggerated by the effacement of the antero-posterior curve. Again, in those cases in which elongation of the limb with abduction at the hip was present, with depression of the pelvis on the affected side, the effect of extension was only to increase this deformity, and to baffle the observations as to the comparative length of the two limbs. The one-sided extension acted on the spine and pelvic joints like traction on one arm of a balance, quite disturbing the equilibrium and intensifying the abnormal deformity. These considerations had before weighed with me in observing the effect of the use of the long Desault's or Lis-

ton's splint, where the one-sided action is very imperfectly modified by the use of the perineal band, which, in my experience, is very rarely effective until its tension becomes unbearably irksome to the patient. The use of a jean slop, to fit on to the opposite hip and thigh, as recommended by the late Sir W. Fergusson, is better; but is difficult to adjust and keep in adjustment, is irksome to the patient, and liable to be much soiled by the use of the bed-pan, etc.

I thereupon began to use double extension, by applying equal weights to each limb, so as to balance the pull on each side of the spine. I soon found that when the muscles of the spine, pelvis, and legs were thus placed *in equilibrio*, the patient was made much more comfortable, remained more quietly in position, and could, if necessary, bear even more absolute weight with comfort.

I begin (in a child under ten years) with a weight of two pounds to each foot, the weights being of lead made for the purpose, of the shape of steelyard weights, and provided with hooks above to fasten to the loop of bandage which is attached to the centre of the sole board.

The weights were then gradually increased by a pound a week, until *the limit of easy endurance* by the patient was reached. At this point it remained during the treatment. I soon found that the forward lumbar curve became much more manageable and sooner obliterated; and I believe that the duration of treatment was thereby sensibly shortened, and the patient throve better and fed better under the effects of increased comfort. Of course, in an older patient more weight will be borne easily; but I seldom exceed the limits of twelve to fifteen pounds in hip cases.

Although much greater weights than these are spoken of as common in surgical books, even as much as fifty pounds, or even double, in cases of fractured leg or thigh in the muscular adult male applied to one limb, I believe, from my experience of double extension in spinal, pelvic, and hip disease, that, used in this form, much less force is required, and especially in cases of coxalgia. It is not so much the amount of the actual pull which we require in such cases, as to ease off the pressure upon the diseased surfaces. This is, of course, limited by the resisting power of the ligaments of the joint, and may easily be made to do harm rather than good, by increasing the tension in the front part of the capsule of the joint, which MM. Martin and Collineau believe to be the main cause of the abduction of the limb met with in certain cases.

What I look for in double extension are the steadying of muscular action and the prevention of spasm, combined with an equal downward and constant pull, tending to relieve the dis-

eased joint-surfaces, and to remove muscular and atmospheric intra-articular pressure. The whole of these indications tend to the attainment of that physiological rest which is a powerful (if not the most powerful) remedial agent in the treatment of joint-disease.

By keeping the pelvis horizontal to the spine, the various tendencies of the limb to become abducted at one time and abducted at another are quietly, constantly and persistently, and soothingly, checked and regulated by a counteracting influence ever present and always acting in the same direction and extent. The method allows perfect comfort and cleanliness to the patient, and all that requires watching is the effect of the strapping upon the heel and ankle. This point of extension may at each dressing be shifted upwards, and I have frequently employed it at the knee or calf, instead of the ankle and foot, either by adhesive plaister or soft broad leglets and straps. The treatment should be continued so long as the patient's health bears the confinement to bed, and then an apparatus to fix the joint in a straight position and which allows his moving about should be substituted. Of these, one of the best is Thomas's splint; but a cheaper, and, when carefully applied, an efficient, substitute may be found in a plaster-of-Paris or silicate of potash spica bandage, or a cast of leather or millboard, which, when stiffened and dried, may be cut so as to make a movable splint for the hip and thigh.

Another class of cases to which the system of double extension is of great value is that in which the sacro-iliac joint is affected with disease. Although those cases are not so common, yet, during the last few years, I have had many under my care.

The early symptoms are apt to be mistaken for those of hip-joint disease. There is the same kind of limping and dragging of the limb, with apparent elongation on the affected side, from sympathetic paralysis of the gluteus maximus, pyriformis, and psoas muscles. This gives rise to a certain degree of obliteration of the fold of the nates, and there is the same deterioration of the general health. In most cases, spasm of the psoas muscle produces a similar tendency to flexion and eversion of the limb that we see in hip-joint disease, and the same effect in exaggerating the forward lumbar curve is observable.

Now here the effect of unilateral extension of the affected limb is undoubtedly injurious, by increasing the elongation of the affected side already produced by the disease. Moreover, the conformation of the pelvic girdle or double arch is such that a one-sided traction, operating through the arch which forms the segment of the circle on the opposite side, goes far to counteract the beneficial result aimed at in relieving the pressure upon the surface of the diseased joint, and strains and

deranges the mechanical equilibrium of the pelvic girdle. The application of the perineal band as the point of counter-extension is, of course, in such cases useless and even injurious; useless, because it is placed on the same side of the diseased joint as the extension; and injurious, because of its pressure in front on the abdominal viscera in the false pelvis, and behind on the posterior supra-iliac spine. Now, in the place of making extension upon both legs which is here advocated, the point of counter-extension is placed in the centre of gravity of the trunk opposite the extremity of the ensiform cartilage, and this inertia or weight of the trunk is brought to bear by raising the bed-foot upon blocks of wood or bricks. These I have frequently supplemented by shoulder-straps, with axillary pads fixed to the rail at the head of the bed, with the addition sometimes of a chin-strap having the same attachment. These I have used, however, more frequently in cases of spinal disease or injury higher up in the trunk, thereby shifting upwards the point of counter-extension.

In cases of disease of the upper lumbar or lower dorsal vertebra, or their joints, I believe that I have secured considerable benefit to the patient by the adoption of double extension, combined with aspiration of the abscesses which form, frequently leaving persistent sinuses, which usually go on from bad to worse, and too often cause despair to the surgeon, and inevitable death to the patient. In such cases, persistent extension in the recumbent posture has, as far as I know, not been hitherto tried by the surgeon. Of course, this method, in order to produce any good whatever, and in fact not to produce harm, must be applied equally to both legs. The system introduced by Professor Sayre attempts to affect a certain amount of extension as a continuation of the effects of suspension by the head and shoulders; but my experience of this method (undoubtedly the best hitherto adopted in supporting the trunk by lateral pressure, and modifying, if not altogether preventing, horizontal and lateral motion) does not lead me to think that any appreciable amount of longitudinal extension is kept up. It certainly does not answer well in those severe cases in which the recumbent posture is absolutely necessary in the treatment. The amount of the weight applied to the legs in the cases I have treated has not been great, sufficient only to give relief, and not to cause discomfort to the patient. Relief it certainly does give in the great majority of cases; and it does so, I believe, by protecting the diseased surfaces from the pressure produced by the contraction (spasmodic or otherwise) of the powerful spinal muscles, which are affected just as the muscles are which act upon the joints of the extremities, and produce the startings of the limb with which surgeons are familiar. We

thus ensure as great an amount of physiological rest to the diseased spinal structures as the problem before us will permit.

Lastly, the brief limits of my design permit me to mention only another class of cases, to which I have applied, I believe, for the first time, double extension to the legs. In a case of fracture of the lower lumbar vertebræ, produced by a fall from a great height, and attended by a complete paraplegia, I placed the patient on a water-bed, raised the foot of the bedstead on two blocks of wood eight inches deep, and applied gradually as much weight to the legs, by two of Buck's stirrups, as the patient could bear comfortably. The idea was, as in the cases of diseased spine, to take off from the fractured surfaces, by continued persistent and gentle extension, the pressure of the powerful longitudinal muscles of the spine, and to ensure as far as possible the apposition and rectilinear direction of the fragments of the broken spine itself. If we consider the effect of the simplest movements of the head and arms upon the spinal structures, and not less the effect of the movement of the ribs in coughing, sneezing, and even in ordinary respiration when the trunk is in the recumbent posture, or when we are floating in water, it will not be difficult to understand how this gentle and persistent extension acts on these structures when injured. The use of a water-bed does not prevent it; nay, in spite of its advantages in other respects, such as the prevention of bed-sores, and in the use of the bed-pan, the movement of the fractured surfaces upon each other is necessarily increased by the rolling and billowy motion of the water consequent upon the least effort of the patient, and produced even by the mere effort of respiration. Now, combined with the water-bed (so necessary in the treatment of these cases), we can very easily employ the system of double extension which I have advocated, and thus counteract to the utmost possible extent the injurious movement that I have mentioned. Again, in these cases there is always a tendency for the pelvis and buttocks to sink into the water-support, and thus to give a bend or curve to the trunk at the point of fracture. This is in a great measure counteracted by the extension, in the vertical direction of the body, by the action of the weights and pulleys. Double extension in such circumstances produces much the same effect as horizontal traction upon the body of the swimmer who is being taught to float by his instructors, by traction upon his head and legs.

I have found that patients express themselves as comfortable under its action, and I feel sure that, when properly and judiciously applied, double extension mitigates suffering and places the patient, as far as mechanical measures can, in a position most favourable for recovery.—*British Medical Journal*, *June* 5, 1880, *p.* 837.

29.—THE TREATMENT OF COMPOUND FRACTURE WITH TINCT. BENZOIN CO.

By Fergus M. Brown, Esq., L.R.C.P.Edin., Wansford.

Some time ago I read a communication on the treatment of the external wound in cases of compound fracture by the tincture of benzoin, and I resolved to try it when I had the opportunity.

On Aug. 27, 1878, I was sent for to see Mrs. R., a widow, who had broken her leg. As I was four miles from home in an opposite direction, and her residence was five miles from my house, I had to drive a distance of nine miles. I found her lying on the bed, the right tibia being pushed through the skin, about an inch protuding. I sent for the nearest medical man, but he was out; so I gave chloroform myself, and before I could reduce the fracture it was necessary either to enlarge the wound or saw off the projecting piece of bone. I first enlarged the wound, but being still unable to bring the ends into apposition, I was compelled to use the saw. Next I put it up in an inside and outside splint, bound with three straps made of girth-web and buckles. The leg was then laid on its outside, and the wound simply covered with a few folds of lint steeped in compound tincture of benzoin. From time to time I had to desist during the operation for the purpose of giving another whiff of chloroform. There was no assistance save that of an ignorant female farm-servant, but my patient kept up well, though her age (sixty-eight) was against her. She had sustained the injury by falling from an apple-tree, where she had been gathering the fruit. Next day the leg felt perfectly comfortable, and after the first five days I saw her only about every third day. I did not move the splints or lint till Oct. 12, on which day I put on a strong starch bandage. The following day, with the help of a crutch, she came downstairs. My last three visits were on Dec. 1, 10, and 31; and now, with a high-heeled boot, she walks about, and attends to her housekeeping and farming as she did before the accident. There never was the least unfavourable symptom, nor was there a drop of pus.

My next case was that of a working timber merchant, Mr. L., aged fifty, almost a total abstainer, who, in superintending the removal of a large tree, was struck by the small and free end swinging round, the horses being attached to the large end. Both bones of the leg were smashed into pieces. There was, however, but a small external wound about the middle of the fibula. I put the leg up in the same way as the last case. Next morning the whole leg from the knee to the ankle was one enormous blister; this I pricked, and covered the whole

surface with lint soaked in tincture of benzoin. From the day I first saw him, April 7, 1879, until he was out attending to his business in a starch bandage by July 1, he had not a single bad symptom. I should add he was the most patient man I ever saw; always took things in an easy way. He had a peculiarity I have not seen or heard of before: did he at any time eat an egg he was certain to have an action of the bowels within ten minutes.

I have not attempted to go more minutely into these cases, as there is nothing important in them; but occasionally country practitioners are at a loss for some remedy for wounds which will obviate the necessity of going every day long distances to dress trifling injuries.—*Lancet, July* 3, 1880, *p.* 9.

30.—ON THE TREATMENT OF CHRONIC INFLAMMATORY AFFECTIONS OF THE JOINTS IN CHILDHOOD WITH ESPECIAL REFERENCE TO EXCISION.

By Howard Marsh, F.R.C.S., Surgeon to the Hospital for Sick Children and to the Hospital for Hip Disease; Assistant-Surgeon to St. Bartholomew's Hospital.

The method of treatment by which these cases may be cured has long been before the profession. It consists in keeping the affected parts at complete rest, and in good position, by means of leather splints or some similar appliance, so that deformity is prevented; and in the use of remedies against the tubercular diathesis. It would be needless to insist on the value of what may seem to you so well-known and commonplace a scheme of treatment, were it not that there are many who appear not to believe in its efficiency; for almost every week cases are brought to the hospital which have been treated merely with tonics and blisters or with mercurial ointment, or tincture of iodine, while the affected joint has been steadily growing worse, and more and more distorted. In many of these cases, especially of knee disease, nothing remains to be done but excision or amputation, or to advise the patient to make the best he can of a distorted and crippled limb, for we possess no means by which, when the tibia is once displaced in relation to the condyles of the femur, this distortion can be corrected. In the following remarks the hip is excluded. The diseases of this joint require special appliances, the details of which I have already ventured to describe.

Although there are several methods by which rest may be more or less satisfactorily secured for diseased joints, the most convenient consists in the use of well-made leather splints. They must be long enough in the axis of the limb to give

thoroughly efficient support. This is especially important for the knee and the elbow. For these joints the splints should extend as high as the upper fourth of the thigh or upper arm, and as low as nearly to the ankle or wrist. The elbow should be put up just within a right angle; the knee as nearly straight as it can easily be brought; the wrist slightly flexed, and the ankle very carefully at a right angle with the leg. Should the ankle be fixed with the heel at all raised towards equinus, the calf muscles are prone, by shortening themselves, to lead to troublesome contraction of the tendo Achillis. The parents are directed to take off the splints once a day, to readjust them, and see that the skin is sound; but with this exception they are worn constantly day and night. They are cut away over any sinus there may be, and wherever threatening suppuration produces local tenderness. If when first seen a knee is found to be contracted, it is put up without any attempt to alter its position. The surrounding muscles under the influence of rest soon relax, and then the joint will gradually become extended, so that the original splints no longer fit. These must now be exchanged for a straighter pair; and these again, in their turn, must give place to a pair adapted to the limb when it has reached the straight position. This spontaneous extension of a limb may be regarded as a sure sign that the state of the joint is steadily improving. These remarks refer only to simple flexion. If there is dislocation, splints can do little, as I have said above, to remove it.

The leather of which the splints are made must be carefully selected. Their credit is often damaged by the use of the wrong material. Common sole leather contains a good deal of grease, and has been compressed in the process of manufacture. This kind remains stiff and clumsy, even after prolonged soaking. You must use leather from which all grease has been removed and which has not been compressed. Such leather, when soaked for five or ten minutes in water at a temperature of about 120°, to which a little vinegar has been added, becomes perfectly flexible and limp, and will either stretch or close like wet flannel, so as to adapt itself to the uneven surfaces of a limb as accurately as a plaster-of-Paris mould. To make the splints take patterns of the two aspects of the limb in brown paper; cut out two pieces of leather according to these, but a little larger in all directions, and, when they are soaked, apply them closely and smoothly to the joint, letting them overlap at their borders; then fix them with a flannel bandage, and leave them for twelve hours to dry and harden upon the limb. Now trim them so that they just meet around the limb without overlapping; cut them away over the front of the patella and bevel their edges, and, with the help

of thick paste, line them with chamois-leather; and furnish them with wide webbing straps fastening with buckles.

I know there are many to whom the idea of keeping joints so long at rest does not commend itself. But, in the first place the repair of diseases so tenacious as these affections are cannot but be otherwise than slow; and, after all, we encounter here only the same difficulties as we meet with in cases of enlarged glands, of ophthalmia, otorrhœa, or ozæna. All these affections demand a large amount of patience. And is it not incumbent on those who reject this method to say what alternative can be adopted? How do they cure these cases? One objection accepted by many as weighty against the principle of long-continued rest is that the joint may become anchylosed. I am convinced this fear is groundless. Experience shows that anchylosis does not occur. A child with well-marked synovitis of both knees of ten months' duration wore splints for upwards of two years, yet her joints, which are now quite sound, preserve their full normal range of movement. Many similar cases might be reported. I have never seen anchylosis occur except in cases in which there has been either acute or long-continued suppuration. Indeed, even if suppuration has lasted for many months anchylosis, whether bony or fibrous, is by no means always the result. I have notes of many cases of repaired hip disease in which, though suppuration existed for periods varying from six to twelve months or even longer, considerable movement remains in the joint. But besides their beneficial effect on the course of the disease itself, the leather splints serve another purpose. They entirely *prevent deformity*. This is a point of the very first importance. As long as you keep these diseased joints in children free from distortion there is—except in all but very rare examples of acute suppuration or where the articular ends of the bones are widely involved—good ground for hope that their cure may be effected. But who has not seen cases in which, though extensive disease of the knee has been completely repaired, the limb is rendered useless by the amount of distortion which has taken place, or others in which, though the disease has never been more than slight in itself, so much deformity has gradually supervened that the joint is irreparably spoilt? But you will ask, is surgery unequal to the treatment of these distorted joints—are not these just the cases for excision? I grant these, if any, are the cases for which excision is appropriate; cases, that is, in which there is little or no disease, but much distortion. But the point is that you excise a joint not because it is the seat of incurable disease, but because it has been allowed to get out of shape. Prevent the deformity and the necessity for excision vanishes.—*Lancet, July* 31, 1880, *p.* 167.

31.—ON THE ASPIRATION OF JOINTS.

By the EDITOR OF THE LANCET.

It is not very long ago that surgical interference with joints was looked upon as quite unjustifiable, and when we remember the results often obtained we cannot condemn the opinion. But with the great advances in the treatment of wounds, and the introduction of novel mechanical appliances, joints like the serous cavities have been brought into the region of practical operative surgery. Professor Lister has demonstrated the propriety, under certain circumstances, of making free openings into articulations, and of securing the thorough escape of all inflammatory products within them; nor need the mobility of the part be endangered by the procedure. Ogston and others have shown how articular processes can be sawn off with impunity, a perfectly movable joint being left. But we desire here to call attention to the far simpler, safer, and more widely applicable operation of aspiration of joints, which has now been very often performed with the best results, and without any serious consequences. The questions that arise in connection with this operation are, What can be attained by it? What are its dangers, and how are they to be avoided? And what are the indications for its performance? Can a joint, for example the knee, be emptied by the aspirator? Undoubtedly it can. The fluid effused into a joint is, as a rule, free from the fibrinous coagula which so often plug the canula when used for effusions in other parts, or remain behind and cause a resecretion of the inflammatory product. The fringes of synovial membrane, however, may plug the canula, or the fluid may be partly encysted, as it were, by the mucous ligament stretching across the middle of the joint, and then the aspirator may only empty one-half of the articulation. On the other hand, we must note that there are some conditions which tend to make aspiration of a joint far more effectual than aspiration of the chest. As the fluid is withdrawn the surrounding soft structures are certain to fall in on the joint and support the capsule in the normal manner. A compressed lung often cannot expand again to its original size, and if the chest-walls are rigid it is obvious that no aspiration can draw out all the fluid, for then a vacuum would be left behind. In a joint there is never any such difficulty in extracting the last quantity of fluid, for the stretched muscles, fasciæ, and skin return at once or under pressure to their original condition. From the close interlocking of the bones of the elbow, there would be more difficulty in emptying that than other joints, but here the operation would be very rarely called for. What are the practical advantages of the treatment by aspiration?

The first is the relief of pain, which is often very severe where a joint is much distended. This tension also leads to a persistence or exaggeration of the inflammation, and possibly to its extension from the synovial membrane to the ligaments and cartilages, and if prolonged causes a gradual yielding and relaxation of the ligaments, and subsequent weakness of the joint, while the maceration in inflammatory fluid may interfere with the nutrition of the articular cartilage. The time that can often be saved by this method is also a valuable consideration. The dangers to be feared are, on the other hand, trifling; all the joints that any surgeon would think of aspirating are easily punctured without risk to any artery or important structure; if the instrument is used with care there need be no fear of injuring the cartilage with the end of the needle or trocar, and as nothing approaching a vacuum is produced in the joint, there is no liability to suction of air into it when the canula or needle is withdrawn. Indeed, if the instrument be clean, and employed with only ordinary care, there need be no hesitation in resorting to its use. Surgeons will no doubt differ somewhat in their judgment of the conditions calling for this treatment. But it appears to us to be desirable in cases of acute synovitis, with severe pain from distension of the joint, or where, from the increased general and local pyrexia, or greater swelling, there is reason to fear that the fluid is becoming purulent; where pus is actually present; where the absorption of the fluid flags or ceases altogether; in chronic serous synovitis or hydrops articuli; in pyæmia and suppurative synovitis, rather with a view of lessening suffering than of assisting the cure. In hydrops articuli it is not enough simply to remove the fluid; the relaxed ligaments require support for some time, and the best method of giving it is to strap the joint carefully and firmly immediately after evacuating it. This is no new operation; it has frequently been done in England, and perhaps relatively more often in America, where Dr. H. O. Marey of Cambridge, Mass., has reported a number of cases of his own and other American surgeons in a paper in the Transactions of the American Medical Association for 1879.—*Lancet*, *May* 15, 1880, *p.* 775.

32.—ON DISEASES OF THE WRIST: WITH REPORT OF A SUCCESSFUL CASE OF EXCISION OF THAT JOINT IN A CHILD SIX YEARS OLD.

By John Fagan, Esq., Surgeon to the Belfast Royal Hospital, and to the Belfast Hospital for Sick Children.

Acute inflammation of the wrist, like that of any other joint, whether depending on traumatic or on specific causes, is a con-

dition that requires a certain stereotyped method of treatment with which all are familiar, and would not require more than a passing notice, but that I feel there is one feature in it that is not sufficiently attended to, the neglect of which may lead to a chronic or subacute inflammation, frequently ending in complete disorganisation of the joint; this feature in the treatment, and the one I consider of most importance in this, as in all joint-affections, is rest.

Rest for a joint, but especially for the wrist, means more than placing it on a splint and securing it by a bandage; by this means you may render the forearm and hand motionless, but rest in the true sense of the word is not obtained. To be effectual, it must be both comfortable and continuous. By *comfortable*, I mean that all causes of irritation, both extra and interarticular, must be avoided. There is to be no strapping, blistering, painting with iodine, etc.; while the interarticular pressure produced by the tonic contraction of the muscles surrounding the joint must be relieved by an extending and counter-extending force properly applied. That the rest be continuous is also of importance, and it should be prolonged till the joint can be freely moved without causing any pain. The mode I have lately adopted for carrying out this principle of treatment in cases of wrist-affections I will explain further on.

We frequently meet with wrist-joints that have been diseased for a considerable time, in which the structures entering into their formation are more or less disorganised; this condition we designate chronic arthritis; it may be the result of traumatic causes, or, if you will, of the scrofulous diathesis. To know what is the best line of treatment to follow in such cases, is often a very puzzling question; and it is in reference to this, I believe, that surgeons are most likely to differ as to the mode of treatment to be adopted.

It is not an uncommon thing to find one practitioner, who has great faith in the unaided powers of nature, recommending the expectant method, by that meaning all recognised forms of treatment short of excision or amputation; another performs excision of the joint, thus assisting, by a timely operative procedure, to get rid of the disease and save the member; whilst a third, having given nature what he considers a fair trial to eradicate the disease, and seeing no improvement, loses confidence in her powers and lops off by amputation the offending member, looking on it not alone as a painful incumbrance, but a possible source of mischief to the rest of the body.

The surgeon who practises indiscriminately any one of these methods, may benefit some of his patients, whilst others are sure to suffer by it. That each line of treatment, if properly carried out in appropriate cases, is the best course to follow, is, I

believe, at the present time a pretty well established doctrine among surgeons; the difficult point being to decide what cases are suitable for one, what for another method.

It was principally with the view of eliciting the opinions of those who have large experience in this branch of surgery, as well as to place before you a few facts bearing on those points observed by me in the course of my practice, that I have been induced to bring this subject under the notice of the Section.

As illustrating the line of treatment I adopt, I will give briefly the leading points in the histories of three cases of diseased wrist, each typical of different conditions to be met with in disease of this joint.

Case 1.—Marianne McC., aged 11, was admitted to the Belfast Hospital for Sick Children in March last, suffering from disease of her right wrist. She was in good health, and the child of healthy parents. The hand was flexed and abducted, presenting the appearance of wrist-drop. The joint was much swollen, and its outlines obliterated from about half an inch above the radio-carpal articulation to near the centre of the metacarpus; there was an irregular ulcer, about the size of a sixpence, on the palmar aspect of the joint, from which there came an unhealthy discharge. She could neither supinate nor extend the hand. She suffered considerable pain; and, when it was not supported on a splint, she carried it resting on the sound hand.

Seven months previously, while engaged in a handkerchief-factory, a fellow-worker threw a bundle of handkerchiefs at her, and to prevent it from passing over her head, she put up her hand to stop it, when it struck her on the fingers, causing forcible extension of the wrist; she suffered sharp pain at the time, but resumed her work. Two months after the accident, she had to give up work, owing to the pain of the joint, and was under medical treatment till she came to the hospital under my care.

I noticed, whenever the sore was being dressed, that, after the anterior splint was removed, she grasped the fingers with the sound hand and forcibly extended them. I took her hand in mine and did the same with greater force; she said she experienced great relief from it, and the more forcibly it was done, the greater the ease to her. It occurred to me then, that if I could construct a means whereby somewhat forcible extension and counterextension could be continuously applied, it would relieve the pain and consequently the interarticular pressure, one of the most important factors, I believe, in the progressive disorganisation of the joint. I believe this splint which I have constructed, and which I now show you, meets all the requirements of the case. It produces extension and

counterextension with any degree of force you may wish to apply. It serves as an easy support for the arm and hand. It does not cause the slightest pressure on the diseased joint, both extra- and interarticular irritation being avoided, while the parts are quite accessible for dressing purposes. To sum up, by means of this splint, relief for the joint, both comfortable and continuous, is secured. (See figure.)

From the time of its application, the pain abated and the condition of the joint improved, and she can now flex and extend with scarcely any pain. The rest of the treatment consisted in keeping up her strength by proper food and occasional tonics, while the sore was dressed with lint soaked in a spirit-and-lead lotion.

Among the surgical works I have consulted, in only one do I find the principle of extension and counterextension recommended in the treatment of wrist-joint disease—viz., Dr. Sayre's book on Deformities and Diseases of Joints. His mode of carrying out the principle, by means of a piece of sole leather moulded to the arm and hand, and retained in position by means of adhesive plaister, is not to my mind an effectual one, and not at all in keeping with the many other ingenious appliances figured in his excellent work.

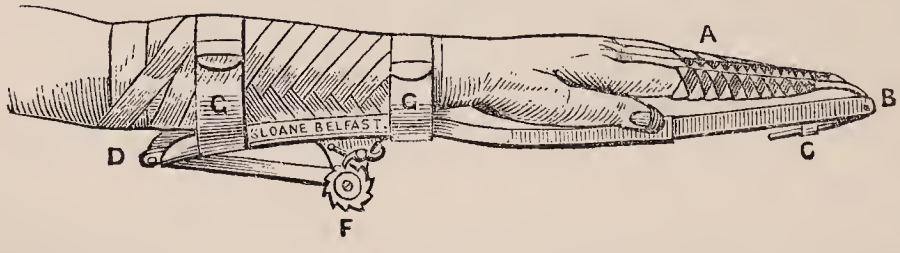
Case 2.—W. H. W., aged 7, came under my care on May 1st. He had a delicate appearance, and was affected with chronic osteitis of the metatarsal bone of the great toe and great enlargement of the glands on both sides of the neck. His family history bad; his father and mother were delicate; two sisters and a brother died of phthisis.

On May 27, after improving his general health, I removed the metatarsal bone; the wound looked well for about a week, and then took on very unhealthy action. Towards the end of June, the bases of two of the metacarpal bones of the right hand and the left wrist began to swell, and soon assumed the typical aspect of strumous osteitis and arthritis. The treatment employed in his case has been nourishment of a suitable kind, to the extent compatible with his assimilating powers. I am also administering stimulants, and a preparation that I believe to be good in such cases, "Kepler's malt-extract with cod-liver oil." The local treatment of the wrist consists in keeping on a plain anterior splint, and applying the spirit-and-lead lotion. Extension in this case is unnecessary at present, as he suffers no pain. Although there is an abscess on the dorsal aspect with very thin covering, I have abstained from opening it, finding, from experience, that to deal with such by the knife is a mistake.

The accompanying woodcut represents the forearm and hand placed in position on the splint, which extends from the elbow

to about four inches beyond the tips of the fingers. The splint is shaped to fit the outline of the arm and hand. Extension is produced by securing on each of the four fingers the toy known as the "Chinese link" (A), to the ends of which are attached vulcanised rubber cords; these play over a grooved roller (B) in the end of the splint, and are made fast by being passed through slits in a block (C). This block plays in a slide six inches in length, on the under surface of the splint, and is adjustable by a rack set in the border of the hand-piece. The slide is deficient for about an inch at the end of the splint; this allows the block to be removed without disturbing the cords. If the wrist require dressing, it is not necessary to remove the splint; all that is required is to take the block from its slide, when the hand can be raised and the part dressed; after which the block is replaced and the requisite degree of extension again produced. Tension on any of the fingers can be modified by lengthening or shortening its cord, where it passes through the block; this can be done by stretching it till its calibre becomes less than the groove through which it passes.

Counterextension is produced by securing to the anterior aspect of the forearm, by means of a bandage, a broad piece of strong adhesive plaster, reaching from a little above the radio-carpal articulation to within two inches of the inner condyle of the humerus. To its upper end is stitched a piece of webbing, one or one and a half inches wide, which plays over the roller (D) in the upper end of the splint, and then, passing over the winch-fashioned roller (F), can be wound up by means of a key to any requisite degree of tightness. The splint can be secured to the arm by a bandage or the straps (G G).



Sometimes the "links" cause a good deal of irritation if the fingers be not protected by a glove, or, better still, by a fold of lint evenly applied: even with this protection, some tender skins cannot tolerate them for more than a few days. In such cases, I adopt the following method. I place the hand on a double piece of strong adhesive plaster, with the non-adhesive surfaces in contact, and mark its outline, as well as that of the fingers, with the point of a scissors. I then cut the plaster, so as to fit accurately the palmar and dorsal aspects of the hand and fingers; and, after heating and applying it, it may be securely fixed by passing a narrow bandage round each

finger, and then round the hand. Pieces of tape are stitched to the finger-ends of the plaster. The rubber-cords, instead of the "links," have small buckles" (those used in hatbands) securely stitched to them; the tapes are fastened to these, when extension can be produced as before, by bringing the cords over the roller and passing them through the grooves in the block. If properly applied, the plaster should hold for several weeks, and without causing the slightest irritation.

By a very simple and inexpensive means, the same principle may be carried out without the aid of an instrument-maker, but not so effectually as by the method already described. Take a light board from half to three-quarters of an inch thick, sufficiently broad to support the arm and hand, and extending from the elbow to three or four inches beyond the tips of the fingers. Let each of the ends be rounded off, so as to form a single broad groove. To the under surface of the splint, at its centre, a piece of webbing two inches long, with a buckle at each end, is firmly tacked on. The adhesive plaster is attached to the arm and hand as before described, and pieces of webbing are stitched to it at the elbow and fingers and carried over the ends of the splint, when they are passed through the buckles, and the necessary degree of extension and counter extension produced.

Case 3.—Lizzie T., aged 6, was placed under my care in May 1876. Both parents were healthy. She was a very healthy child before she met with this accident. About two years previously, she fell down stairs, injuring the right wrist somewhat severely. The medical man who saw it said it was a bad sprain, and treated it accordingly. It remained in a stationary condition for a considerable time; not well, yet not painful. It then gradually became worse, and, about six or eight months before I saw her, she suffered intensely from the pain of it; and, according to the mother's statement, scarcely ever got a good night's rest, while her health was becoming seriously impaired.

When I first saw her, the wrist was very much swollen, measuring six and a quarter inches, whilst the sound one measured but four and a half in circumference. The whole joint was exceedingly painful on manipulation, but especially so over the lower end of the radius, or when the ends of the radius and ulna were pressed together. She was unable to grasp anything, and all the motions of the joint caused her pain. She was under the care of several medical men; and the expectant method, in its various aspects, was tried without avail in her case. Amputation was suggested a short time before she was placed under my care.

I employed the expectant method of treatment for a period

of three months; but seeing no improvement, resolved on excising the joint. With the child fully under the influence of ether and an Esmarch's band applied, I removed the joint according to Professor Lister's method, following as closely as possible the very graphic and exhaustive instructions laid down by him for the guidance of those undertaking it. The operation lasted one hour and a quarter; one artery (the metacarpal) required torsion. I introduced into the lower part of the wound a thick roll of carbolised tow, to serve for drainage as well as a support for the tendons.

For the first four days, she experienced the usual inconveniences following serious opertions. In four weeks the wounds were almost healed, and she began to do some knitting; and, in seven weeks from the date of the operation, she left the hospital greatly restored in health, the wounds being quite healed, and both fingers and hand possessing considerable range of motion.

It is now three years since the operation was done. She has nearly as much power in it as in the other, and she experiences scarcely any inconvenience in the discharge of her ordinary duties.—*British Medical Journal, May* 22, 1880.

33.—THE METHOD OF PREPARING PARAFFIN SPLINTS.

By Dr. William Macewen, Surgeon to the Royal Infirmary, Glasgow.

In a paper published in the Lancet for Aug. 31, 1878, the writer described the method of making "Paraffin Splints"—the vehicle being gauze. Since then a considerable variety of material has been experimented with, in view of providing a better and cheaper vehicle for the paraffin. Among other substances tried were straw, hay, paper (including newspapers), oakum, flannel, cotton, and cotton wool. A bunch of hay, laid out in a flat form, and tied together with string, could be made into a firm straight splint on the addition of paraffin. A Herald newspaper and a couple of pounds of paraffin, could be converted into a very excellent temporary splint for the leg, serviceable in an emergency. Most porous materials, or anything which can catch the paraffin in its meshes, can be made the vehicle for the paraffin splint. The more absorbent the material the better. The next quality is adaptability.

It is desirable to get a substance which can be readily adapted to the limb. The material which answers these purposes best is cotton wool. Any kind of cotton wool may do; but the unbleached, unrefined cotton, made up in pound parcels is much better than the white refined material. Each pound of the unbleached cotton consists of a single sheet or layer, having

a considerable amount of coherence, this latter quality being advantageous during its manipulation and adaptation to the limb. A pound of cotton wool of this quality costs about 7½d. to 8d., and can be supplied at that rate to hospitals. The white refined cotton wool, commonly sold in druggists' shops, is dearer, and not so well adapted for the purpose. Wadding used for stuffing dresses, and which is obtainable in sheets, glazed generally on one side, would also make a good vehicle for the paraffin, if it were not for the fact that the sheets, as a rule, are too thin, and where a couple of them are applied, the glazed surfaces prevent that perfect cohesion which the splint ought to have. The "absorbent cotton wool," used by Dr. Gamgee, Birmingham, is also very serviceable, but dearer.

When about to make a splint, this pound packet of unbleached cotton wool is taken and the single sheet unfolded. The thickness of this sheet is generally sufficient for most splints of the leg and the arm; if the surgeon, however, desires to have it thicker, he can double the layer. A portion of this sheet, of sufficient size to envelop the limb, is cut with scissors,—not torn. It is not necessary to be careful about forming the cotton wool into any particular shape, provided it is sufficient to cover the limb and slightly overlap. The adaptability of the cotton is such that it fits the various curves of the limb. The portion so cut is rolled up into a form which will enable it to be placed into the vessel containing the liquid paraffin. It is then submerged in the paraffin for a couple of minutes. As demonstrating the amount of paraffin the cotton wool will take up and the rarefaction of the cotton wool itself, it may be said that, the vessel containing the liquid paraffin may be almost full, and yet a large roll of cotton may be passed into this dish without causing the paraffin to overflow. After it is thoroughly saturated, the cotton is turned out of the vessel on to a portion of "mackintosh," which has had its surface previously oiled, in order to prevent the paraffin adhering. On this surface the sheet of cotton is unrolled. In lieu of the oiled mackintosh a piece of paper, a tray, or the polished surface of a table, provided these are well oiled, may be used. After the paraffin has cooled to such an extent as to enable the surgeon to place the back of his hand on it without inconvenience, it is ready for application to the limb. This cooling process will occupy about three or four minutes, more or less according to the thickness of the layer. During this time the surgeon may occupy himself in preparing the limb of the patient. This may be done by applying either a gauze or other roller bandage, so as to prevent the paraffin coming into direct contact with the limb; or by placing one or two strips of tin next to the limb as a guide for the cutting off of the splint.

When the splint is not to be removed from the limb till the end of the treatment of the case, such as in a simple fracture, the former method may be adopted; but when the splint has to be cut off immediately after its application, such as one would prefer in a compound fracture, the latter method is the preferable. This sheet of cotton wool, saturated in the paraffin, is then applied to the limb, the surgeon seeing that the cotton overlaps; he then applies a bandage, preferably of gauze, pressing the cotton firmly. This pressure causes a greater cohesion in the splint, and also squeezes out any superabundant paraffin. The limb is then plunged into cold water, or cold water is applied externally, when the splint will become solid in a few minutes. If, however, the splint is to be removed, instead of placing it in the cold water, it is cut up the side opposite the tin strip previously introduced. This may be done by first marking a line with a sharp knife, and subsequently cutting it up with dressing scissors. As soon as both sides of the splint are cut, before removal from the limb, it may be then plunged into the cold water; and after it has acquired a sufficient consistency to prevent alteration of shape, it may be removed from the limb and plunged into the water to complete the consolidation. If it should be very inconvenient to cut the splint on both sides of the limb, the splint may be cut on one side only, and then separated so far as to enable the limb to be withdrawn, the surgeon seeing that the shape of the splint is retained, and after removal from the limb, the opposite side can be cut if desired. Windows can be made in the paraffin at any part wanted. The time occupied in applying such a splint, cutting it off, and consolidating it, would probably be about ten minutes. If the surgeon, instead of wishing to consolidate the paraffin, would like for any reason to retard the cooling, he, in that case, does not apply the cold water; the paraffin then remaining from about twenty minutes to half-an-hour in a plastic condition. This latter quality is of considerable advantage under many circumstances, such as where it is necessary to put particular pressure on a spot, so as to retain the broken fragments of a bone in a particular position. In doing so, the contour of the bone may be made out through the still soft paraffin, the particular locus for the pressure can in this way be accurately ascertained, and while the finger is still holding the part, cold water can be applied so as to consolidate the splint; and so maintain the pressure on the part desired. Or, in treating talipes, according to the German method of stretching the tendons, the paraffin may be applied in its softened condition, then the foot can be turned into the desired position, and while holding it, it is plunged into the cold water until consolidation takes place.

The paraffin must have a guaranteed melting point of 130° F. It ought to be odourless, whitish, or semi-translucent. It is supplied in solid blocks, and to facilitate its melting it ought to be paired down. The paraffin shavings are placed in a vessel—preferably of tin—and this vessel is placed into another containing boiling water, liquefaction taking place in ten minutes. It is advisable not to place the paraffin on the fire, because if poured upon the fire it burns like grease. It is correct to state that a lighted match thrown into the paraffin would not make it explode or burn. There is no likelihood of any atmospheric temperature in this country affecting splints made of paraffin having a melting point of 130° F. Paraffin splints do not shrink or contract on the limb in the same way as starch or plaster-of-Paris bandages do. This at first sight might seem strange, as every body contracts as it cools, and paraffin forms no exception to this rule. But this apparent contradiction may be explained by bearing in mind that the first part to cool is the external layer, the internal being kept warm, both by its own heat and the heat of the body, so that the cooling will take place from without inwards, and the contraction will take place towards the outer layer. As a consequence of this fact, the bandages should be applied with the firmness which it is necessary to maintain. If any doubt remains regarding the amount of pressure exercised, the surgeon will be able in a few minutes to see the result of the pressure on the extremity of the limb.

The hands of the surgeon get smeared with the paraffin, but this can be easily removed by washing them in hot water. Before touching the melted paraffin, if he rubs his hands over with glycerine, the paraffin will not adhere in the same way. The India-rubber sheeting on which the layer of cotton saturated with paraffin is spread, ought also to be placed under the limb during the application of the splint, in order to catch any drops that may fall. If the paraffin is then allowed to cool it will peel off the mackintosh in scales. All scraps of paraffin ought to be collected and kept for future use. If any paraffin lodges on the clothes it can be removed when cool, in the form of scales. Any portions that may still adhere to the cloth may be got rid of in either of two ways :— by putting the article into hot water, or by placing a piece of blotsheet or brown paper on the outside and ironing it with a hot iron—the blotsheet sucking up the paraffin. When the splint has served its purpose, and is of no further use, it ought to be plunged into boiling water, and a weight placed on it so as to sink it to the bottom. The paraffin, as it melts, rises to the top and floats, while the cotton wool and any dirt which may have gathered, remain at the bottom. The water is allowed

to stand till it is cold, when the paraffin may be lifted off the top, in the form of a solid cake. It is then ready for further use. If it should happen to have any odour, one or two washings with boiling water will remove it. In this way, the paraffin may be used again and again. The same paraffin has been used in my wards for the formation of three or four different splints. Not only can paraffin be used for ordinary splints, but a Sayre's jacket can be well made out of it. The saturated cotton sheet being applied to the body, so as to envelop it, the superabundant paraffin is removed by pressure of gauze bandages. The jacket is then cut up one side, cooled with cold water, removed from the body, and hooks inserted whereby it can be laced. It can then be put on and removed at pleasure. It may be taken off at night, if that be advisable; and it permits of the performance of the ordinary ablutions, which adds greatly to the patient's comfort. In cases of compound fracture, where it was of importance to maintain the bones in absolute repose, the splints had a number of apertures made in them in such a way as to enable a watery carbolised solution to be poured through them on to the limb, the solution, along with any discharge, finding exit in apertures made in the most dependant portions of the splint. In this way the limb has been washed without interfering with the osseous union. In such cases an external gauze dressing is applied on the outside of the splint.

Paraffin, as a material for the formation of splints, possesses the following advantages—First, it is always ready for use; it may be kept for any length of time without spoiling or undergoing change, unless it is exposed to heat. Water or moisture has no effect upon it, and it is quite impervious to discharge. Second, it is easy of application, requiring no special training or dexterity; and the surgeon can have it ready in about fifteen minutes after ordering it. Third, its rate of consolidation is entirely in the hands of the surgeon. It can either be consolidated in a few minutes, or kept plastic for half-an-hour. Fourth, it can easily be cut with a pair of dresser's scissors before cooling, or with a sharp knife after it has consolidated. Fifth, the splint is light, easy, and comfortable to the patient. Sixth, it may be used repeatedly. After one splint is finished the paraffin can be melted and re-applied; so, although its primary cost is greater than plaster-of-Paris it is ultimately cheaper. A splint made in this way, applicable to the lower limb, would cost from one to two shillings, according to the size of the limb.—*Glasgow Medical Journal, August*, 1880, *p.* 135.

34.—AIR OR WATER PADS FOR SPLINTS.

By Dr. EDWARD C. THOMPSON, Surgeon to the Tyrone and County Infirmary.

The air- or water-pads that I have had manufactured by the Britannia Rubber Company, 32, Cannon Street, have given me the greatest satisfaction. I exhibited them before the North of Ireland Branch of the British Medical Association at the recent meeting in Belfast. The members present seemed to approve highly of the pads, and considered they would supply a want much felt by surgeons. In one important particular I know they are eminently serviceable, and that is in entirely solving the long-vexed question of sore-heels in the treatment of fractures of the lower extremity. One of the little heel-pads filled with air or water, and placed under the heel, in a box-splint or any other fracture appliance, will prevent the patient from complaining of the slightest pain or inconvenience, no matter how long it may be necessary to keep the limb in position. Such has been the result of my own experience. To guard, however, against the possibility of pain, I have had attached to each pad a small tube about four inches long, with a stop-cock, by means of which the pressure on the heel can be relieved by allowing exit to a small quantity of air or water, or again, if necessary, by further inflation. The small perineal pad is placed between a fold or two of linen, and prevents irritation when counterextension is necessary, as in fractures of the neck of the femur, etc. The side pads for fractures of the upper or lower extremity are on the same principle. They can be filled with air or water, and are made of all sizes. (The following sizes are mentioned by the author, viz.:—Leg-pad, 18 inches long by 4 inches wide. Heel-pad, 5 inches long by 4 inches wide, with a hole for heel, $1\frac{1}{2}$ inches in diameter. Perineal pad, 18 inches long by $1\frac{1}{2}$ inches wide.)

For padding a McIntyre's splint, these pads are invaluable; the leg lies on a small air- or water-bed, and the patient never complains of pain or inconvenience; indeed, the limb will rest upon one of them for months without discomfort. Before applying a pad, I place it in a cover of linen, which is made waterproof by a simple chemical process known to everyone, and which I need not here detail. I then inflate it, and it is at once ready for use. If the limb be inflamed or irritable, I fill the pad with water instead of air.

I can testify, from experience, as to the great satisfaction afforded both to surgeon and patient by these pads, and they seem to me to fulfil a desideratum in surgery.—*British Medical Journal, April* 10, 1880, *p.* 558.

35.—ON THE TREATMENT OF SPRAINS.

By R. Dacre Fox, Esq., Surgeon to the Manchester Southern Hospital, and to the Manchester, Sheffield, and Lincolnshire Railway Company.

Sprains may be broadly divided into two kinds, mild and severe; the former consisting of merely a temporary overdistension of the parts around a joint, which rest and anodyne applications usually soon cure; the latter involving, as I believe, much more serious pathological results, which the following plan is specially contrived to obviate.

The effects of a severe sprain are, that the fibrous ligaments controlling the movements of the joint and binding the tendons in their grooves become overstretched, swollen, and softened; the cellular tissue about the ligaments and in the tendon-grooves becomes œdematous; and plastic material is exuded; while, as a consequence of these changes, the tendons are displaced in their beds. If this condition be not actively treated, it may, and often does, lead to continued lameness, due, in all probability, partly to a diminution in the calibre of the tendon-groove, with impaired muscular action, and partly to the torn ligaments and bruised cellular tissue having undergone changes which render them incapable of adapting themselves to the movements of the joint, which are consequently impeded. I believe this result may be prevented by the application of firm direct equal pressure, applied manually at first, and kept up and controlled by pads placed in the line of the tendons, and kept in position by properly shaped plasters and bandages, and sometimes by splints. This pressure helps to disperse the œdema, to replace the tendon in its normal position, to hasten the absorption of any plastic exudation, and thus to prevent diminution in the calibre of the tendon-groove. I cannot say this is a novel method of treatment; but I think it is one not usually practised, partly because it entails the expenditure of much time and trouble, and partly, I feel sure, because there is and has been a tendency to under-estimate the inconvenience and distress arising from a badly sprained joint.

The common practice, in treating a sprain, is to put on a bandage, telling the patient to take it off if the joint becomes painful, and to substitute warm water fomentations. When the swelling has subsided, if the injury be not so slight as to be already cured, a liniment or the application of iodine is generally ordered. Very frequently the tight bandage causes inflammation, while the rubbing and painting are practically useless. There are numbers of cases of slight sprain, indeed, which will get well with comparatively little treatment or none at all; but in that more severe form where, after an inflam-

matory or at least exceedingly hyperæmic stage, swelling takes place with the results I have described, the application of these remedies does not prevent the joint from being left rigid, painful, and unfit for use for a very long period. Now it is, as I have said, in preventing all this, that the plan of treatment by direct, equal, and continuous pressure will be found exceedingly valuable; for, where it has been properly carried out, I have always found that the joint returns quickly to its normal condition—pain being speedily relieved, and rigidity prevented. The treatment may be divided into two stages; the first lasting from a day to a week or longer, during which the treatment has to be directed to averting inflammation by rest, warm applications, anodyne lotions, etc.; the second commencing when the joint has become cold, swollen, and painful on movement—in fact, when the injury has assumed a more or less chronic character. It is during this second period that I believe the active treatment I advocate ought to be employed. It is important not to commence this until the surface-heat is normal; for undoubtedly, when any tendency to inflammation exists in the tendon-sheath, pressure aggravates it, and I have known it to lead to untoward results.

It is of course impossible, within the limits of this paper, to describe the special adaptation of this method to each joint; but I will take as an illustration the ankle. If a wire be passed round the joint so as to impinge on the two malleoli and the tendo Achillis, it will define three or four well-marked hollows: one on each side of the tendo Achillis behind each malleolus, one in front of the fibula, with a fourth shallower one in front of the tibia. When the ankle is severely sprained these fossæ become obliterated, and are filled up with effusion, overstretched ligaments, and displaced tendons.

Observation has led me to believe that there are very few sprained ankles in which muscular displacement to some degree does not take place. It most commonly occurs in front of the outer malleolus, involving the outer part of the annular ligament, the extensor longus digitorum, and the anterior fasciculus of the external lateral ligament; next, perhaps, the posterior peroneotarsal ligament and structures behind the external malleolus. Cases of similar overstretching and displacement on the inner side of the ankle are happily rare; but in gravity they bear much the same relation to the former as a Pott's dislocation does to a simple fractured fibula. I will assume an ankle-joint has sustained a severe sprain all round, and has arrived at the chronic stage; modifications of the treatment of such a case will meet all that are likely to occur. To carry out the first principles of treatment by direct, *equal*, and continuous pressure, it is clear the fossæ mentioned above must be filled,

or rather their sites covered by pads so as to cause the retaining plasters, bandages, and splints to exercise equal pressure everywhere. By making pressure with the thumb from below upwards in the line of the fossæ, a good deal of the œdema may be squeezed away and the displaced tendons in some degree restored. I make, as a rule, five pads (of tow and lint or leather): two about four inches long by one inch wide (one a little shorter than the other, so as to be better adapted to the curve extending upwards from the dorsum of the foot to the crest of the tibia); another shorter, broader, and thinner, to place over the tibialis anticus and extensor proprius pollicis; and two, three or four inches long and bolster-shaped, to fill in the posterior fossæ on each side of the tendo Achillis. It is often advisable, in old-standing cases, to supplement the pads by strips of plaster to ensure firmer pressure. Both pads and strips of plaster should be made exactly to fit, as, if too large, they are useless, from the pressure being too diffused; and, if too small, they exercise too little pressure. A moment's consideration will render this obvious. If too large a pad, for instance, be placed over the outer postmalleolar fossa, its edges rest on the tendo Achillis and outer malleolus like the piers of an arch, leaving the fossa itself untouched. To keep these pads in their place, I use a long extended half-moon-shaped piece of plaster (emplastrum saponis spread on leather), long enough for the ends to overlap in front when the heel is placed in the centre, and a narrow oblong piece above this, placed round the lower part of the leg, to cover the upper part of the pads. The handiest way to apply the pads is to place an India-rubber band above the ankle, to slip the pads under it, and then, planting the heel in the centre of the curved plaster, to bring the two ends across the front of the joint so as to overlap. The pads having been secured in position, the elastic ring is to be cut, and the oblong piece of plaster put on so as to encircle their upper ends; lastly, the whole ankle is to be firmly bandaged. Amongst the working classes, or in the case of an uncontrollable patient, it is advisable to apply two thin splints over the anterior pads, keeping them in position by a long strip of adhesive plaster. Where there is much superficial ecchymosis, where there are bullæ, or where there is unhealthy-looking skin, instead of using soap-plaster, the pads may be kept in position and pressure maintained by a piece of lint on which ointment has been spread. Calamine ointment made stiffly is clean, and not uncomfortably greasy. If, as occasionally happens, even this should cause irritation, warm wet lint covered by oiled silk may be advantageously used over the pads, and secured by a firm bandage; but neither of these applications can compare in efficiency with the soap-plaster spread on leather.—*British Medical Journal, Sept.* 25, 1880, *p.* 504.

36.—ON SURGICAL STATISTICS.—THE ANTISEPTIC TREATMENT.

[The discussion on Surgical Statistics given in our last volume (*Retrospect*, vol. lxxxi, pages 163, 170, 174) is thus summed up by the Editor of the British Medical Journal.]

In commenting on the recent antiseptic discussion at St. Thomas's Hospital, after referring to the fallacies inherent in statistics, we said: "The real proofs that antiseptic surgery has introduced into science and into practice a new principle are those on which Mr. Lister has always insisted, and which he once more brought into prominence on this occasion. Let any surgeon under any other system produce cases in which a long series of the most tremendous operations in surgery have been effected without raising the clinical thermometer, without traumatic fever, without septic irritation, without any of the indications of danger which follow ordinarily the surgical invasion of the tissues; let him produce psoas abscesses following the course which they do follow under antiseptic surgery; let him show blood-clots organising and dead tissue undergoing absorption; let him show a long series of great operations in which the presence of pus is an exception. This cannot be done."

In answer to this so-called "challenge," a paper has been published in our columns by Professor Spence, in which he attempts to produce evidence in favour of what he terms "simple" methods of dressing. Instead, however, of applying himself to the point at issue, and trying to show that the results mentioned did not indicate a new principle, he contents himself with pointing out that, under "simple" methods of treatment, patients who have undergone severe operations *may* not die in any larger proportion than those who have been operated on antiseptically; and, in support of this statement, he brings forward a table of sixty-three amputations with only three deaths, and of twenty-three excisions of joints with only one death. Some of these operations were performed in hospital, some apparently in private practice.

But if we look at the detailed account of Mr. Spence's results published in our issue for Feb. 14, by Mr. Cheyne—an account which Mr. Spence has not questioned, and which we must, therefore, accept as correct—we see that this is merely a very exceptionally favourable series of cases which occurred some years ago in Mr. Spence's practice. It does not indicate anything in favour of a special method of treatment, for it is acknowledged on all hands that such a series of successes may occur under any method of treatment; and, indeed, Mr. Spence, in his Lectures on Surgery, brings forward this very table, and

contrasts the results with those which he usually obtains, in order "to show how the results of statistics may fluctuate independently of any change in the treatment." And if we look at Dr. Braidwood's table of cases of pyæmia for the years 1860-61, 1861-62, and 1862-63, we find that 17 cases of pyæmia alone occurred during that time in Mr. Spence's hospital practice. This fact sufficiently shows that the series of successes which Mr. Spence has produced could not have been due to any marked influence of "simple" dressings *per se* in preventing septic diseases. On the contrary, it distinctly indicates that the good result depended on other causes than on the methods of local treatment adopted; and that, where circumstances were present which favoured the occurrence of septic diseases, such as the nature of the injury or disease requiring operation, the constitutional condition of the patient, etc., the method of treatment employed had little or no effect in preventing their development. And if we take the same period during which Mr. Lister's results were obtained, by which time it may fairly be presumed that Mr. Spence had attained great experience and skill in the application of the method of dressing which he now thinks to have been so useful in 1860-61-62, we find a very marked contrast between Mr. Spence's results and those published by Mr. Lister; a difference in mortality as regards general results of 17·5 per cent. in Mr. Spence's cases, compared with 5·1 per cent. in Mr. Lister's, or, as regards the results of amputations alone, of 25·7 per cent. in Mr. Spence's practice, as compared with 11·25 in Mr. Lister's.

Mr. Spence makes no allusion in his paper to the manner in which healing occurs under "simple" methods of dressing; but, to take one example from his Lectures on Surgery, he says, speaking of lacerated wounds: "There is always in large lacerated wounds a certainty of partial sloughing at least, and great suppuration from the injured textures." And yet Mr. Lister tells us that, in such cases, the wound becomes filled by blood-clot, which serves as a mould for the young organising tissues, and healing occurs without sloughing or even suppuration. Such a process is nowhere alluded to in Mr. Spence's works as occurring in open wounds, while Mr. Lister states that it is the ordinary method of healing of open wounds under a moist dressing when treated strictly antiseptically.

In his paper, Mr. Spence makes no reference to such operations as incisions into joints; but, in his work on Surgery, he says, with reference to the removal of loose cartilages from joints: "There is no class of operations that I have a greater dread of than the apparently simple one of removing a loose cartilage." What a contrast between this statement, and the confidence with which Mr. Lister and his followers assert that

a joint may be freely opened with antiseptic precautions, and kept open for some days by means of a drainage-tube passing into it, without any inflammation of the joint or impairment of its mobility!

Lastly, what has Mr. Spence to say as to spinal abscess? In looking over his published results, we find an almost entire absence of mention of such cases. Nevertheless, his own statements on the subject and the difficulty which he experienced in understanding Mr. Lister's description of the aseptic course of these cases sufficiently show that, by the aid of "simple" methods of dressings, he has not succeeded in obtaining anything like similar results. In striking contrast to the ordinary progress of these cases we have Mr. Lister's statements, and statistical evidence brought forward by Dr. Bishop in our issue for Jan. 31.

Thus far we have dealt with this discussion in reference to our own article; but Mr. Spence has also asked for explanations of some of Mr. Lister's statements and supposed omissions. We need only point to the reply given by the latter—a reply which, while it adds much in explanation of the statistics which renders them more valuable, also clears away any doubt as to their completeness which might have arisen in the minds of some after the perusal of Mr. Spence's paper. Mr. Spence seems surprised that Mr. Lister should have looked on some expressions as reflecting on his character as a surgeon and as a gentleman; and we are very much pleased to find that, in his reply, he strongly disclaims any desire to cast such imputations.

In summing up, we need only repeat our statement that Mr. Spence has entirely missed the points at issue. We do not require statements as to general results. What we do want is evidence to enable us to judge whether the same constant results, which are so notable a feature of strict antiseptic treatment under any circumstances, can be obtained by "simple" methods of dressing under unfavourable circumstances, such as bad hygienic conditions, or after certain operations, such as incisions into joints, psoas abscess, etc. If this cannot be done, then, in spite of any number of favourable results in favourable cases, we must recognise that the surgeon who treats his patients on the principle of total exclusion of living septic particles is acting on a new principle, and is able to obtain results better that those which can be got otherwise. Our position in reference to this subject is in nowise shaken by what has passed; on the contrary, the result of the discussion has only been to bring out in more striking contrast the imperfections of "simple" methods of dressing in the hands of a most distinguished surgeon, when compared with the brilliant results of treatment conducted on strict Listerian principles.—*British Medical Journal, April* 10, 1880, *p.* 559.

37.—LISTER'S ANTISEPTIC METHOD OF TREATMENT. CARBOLISED CATGUT LIGATURES.

By Dr. GEORGE BEATSON, B.A.Cantab., Glasgow.

[Dr. Beatson gives a most interesting and minute account of the mode of preparing and the method of applying carbolised catgut ligatures, also of the influence of the living tissues upon them in aseptic and septic cases, derived principally from the writings and lectures of Professor Lister himself. Our readers will find full details of Prof. Lister's observations and researches on the antiseptic method of treatment in the following volumes of the *Retrospect*:—vol. lvii, 1868, pp. 115, 119; vol. lviii, 1868, pp. 171, 191; vol. lix, 1869, pp. 131, 142; vol. lxxi. 1875, pp. 137, 147; vol. lxxii, 1875, pp. 107, 117; and vol. lxxiii, 1876, p. 123.

We understand that Dr. Beatson is about to publish the whole series of his papers, now appearing in the Glasgow Medical Journal, in a separate volume, with illustrations. It will form a valuable and useful manual on the antiseptic treatment. In our last *Retrospect* we gave his chapter on the Antiseptic Gauze, and we here print an abstract of No. 5 of the series, on the Carbolised Catgut.]

The word catgut is a misnomer, as it is really from the intestines of sheep and lambs that we get the so-called catgut ligatures used in surgical practice. The intestines are taken warm from the animal, and after being freed from all feculent matter and fat, they are soaked for some hours in water. When sufficiently steeped, their external covering is removed by scraping them either with the back of a knife or other suitable instrument. This is followed by another steeping in water, and they are alternately scraped and soaked until they are completely purified, when they are placed for two or three hours in a weak solution of potash, with a view of still further cleansing them. This done, the large intestine is cut off, to be utilised for other purposes, such as sausage coverings, while the small intestines, after being rendered smooth by passing through a perforated piece of brass, are used for making catgut threads or cords. This is accomplished by thoroughly drying them in the sun or in hot air, then cutting them into the different sizes, and rounding them smooth by passing them through the holes of a machine made specially for the purpose. The threads are now quite ready for use, but in order to whiten them and also free them from any animal matter which would be likely to cause them to putrefy, it is customary to subject them to the fumes of burning sulphur, a process which requires considerable care in its application, for if threads are sulphured too long they become very brittle and are liable to crack and be weak. The

threads prepared in this way are then further smoothed by rubbing with a horse hair cloth, and are of various sizes, the smallest being not much heavier than horse hair, and is known as "minikin gut," or "bow-gut." There are four different sizes of carbolised gut principally used in surgical practice. No. 0 is the "*minikin gut.*" Nos. 1 and 2, known as *fine* and *medium*, are the two sizes chiefly employed. No. 3, *large*, is very strong, and such as would be used for ligature of the pedicle in ovariotomy. I am not in a position to say whether the catgut threads employed for all catgut ligatures are manufactured in Great Britain or come from abroad, but France, Italy, and Germany, are famous for the manufacture of catgut. For musical instruments the Italian gut is much preferred, and is remarkable for its strength and clearness. Dr. Ure suggested that this superiority of the Italian catgut is due to the fact that the Italian sheep are not so highly fed as our English ones, and, as is well known to physiologists, the membranes of lean animals are tougher than those of creatures in high condition and very fat. The catgut threads suitable for surgical ligatures are usually sold in hanks or skeins measuring about six yards each in length.

This material has not the slightest connection with the white silk-worm gut so much used by anglers, and proposed by some surgeons as suitable for sutures, and which is really the secretion procured from the silk vessels of the silk-worm caterpillar (Bombyx mori), just before it begins to spin.

Mode of Preparation.—To carbolise skeins or hanks of unprepared gut is a matter requiring considerable care and management. Wind each skein or hank into a coil on the fingers, and then string these coils on a thread of horse-hair, which has a bit of stick fastened at each end of it to prevent them slipping off. This facilitates the handling and removal of the hanks at any time. Then place the hanks, loosely coiled up, in an ordinary brown jar, or in one of the glass jars used for mounting specimens, or in a glass flask, and pour on them an emulsion made by mixing one part of crystallised carbolic acid (deliquesced by means of one-tenth its weight of water) with five parts of olive-oil. In other words, the formula advised by Mr. Lister requires, for every ounce of carbolic acid, 48 minims of water and five ounces of olive oil. Should a considerable quantity of the mixture be needed, mingle together in a suitable vessel the proper quantities of water and crystallised carbolic acid rendered liquid by heat, and then add, by degrees, the required amount of pure olive oil. When these are well mixed together, the result is a very fine emulsion, in which menstruum the catgut should steep for *at least two months*, after which period it is ready for use, though it is better to let five or six months elapse before using

it, and the longer it has been prepared the better. Place in the jar a partition of glass or other material, supported by pebbles or marbles, at a short distance above the bottom, *to afford space for the water that slowly subsides to accumulate in*, and thus prevent it from coming in contact with the hanks of gut. It will be at once seen how necessary this is, for if the gut lay soaking for two months in the water which had subsided to the bottom of the vessel instead of in the emulsion, it would not be properly prepared. This is due to the fact that, though the water would doubtless contain some carbolic acid, it has been found that if a watery solution of carbolic acid be used for making the catgut antiseptic, "the protracted immersion requisite to ensure completeness of the effect makes the finer kinds too weak and the stouter too clumsy." (Lancet, April 3, 1869. *Retrospect*, vol. lix., p. 141.) The jar or vessel holding the skeins must be kept in a cool place and have a covering on it to prevent any volatilisation of the carbolic acid. It is also advisable to move the skeins or hanks about in the mixture at intervals. Although two months is the shortest time at which the gut can be considered fit for use, yet it goes on improving in quality for an indefinite period, if retained in the same oil; and gut that is carbolised and ready for use should always be kept in 1 to 5 oil.

It will be seen that the mode of preparing the carbolised catgut is a simple one, and such as any surgeon could himself carry out with little difficulty. It would almost be as well if each surgeon prepared his own ligatures, for then he would know exactly what he was using, whereas when he purchases them he is quite at the mercy of the instrument maker who sells them, and who may, from mere ignorance or inattention, furnish him with ones that are made from *unsatisfactory gut* or are *unreliable from not having been steeped the statutory time in the emulsion*. Mr. Lister gives this warning as to the necessity for having the catgut ligatures properly prepared:—"It is of the utmost importance that the catgut should be rightly prepared, for, if merely imbued with an antiseptic salt, it is utterly unfit for surgical purposes, becoming soft and slippery when moistened, so that it will neither bear the requisite strain nor keep its hold when tied. But it is a happy circumstance that the animal tissue (the peritoneum with some unstriped muscular fibre from the sheep's intestine) undergoes a remarkable physical change if suspended for some weeks in an emulsion of water and oil, in which, after growing soft and opaque during the first few days, it gradually experiences an alteration of an opposite character, and at length becomes again quite transparent, and is then little affected by water, and holds better when tied than waxed silk." (Holmes' System of Surgery, vol. v. p. 622). The following points elicited by Mr. Lister in the course of his investigations with catgut are detailed by him

in his Observations on Ligature of Arteries on the Antiseptic System, published in the Lancet of April 3, 1869. (*Retrospect*, vol. lix, p. 141.) (1.) The objections to catgut in its dry state are its rigidity and a tendency on the part of the first knot to slip before the second half of the knot is secured. (2.) Though water renders catgut supple, and as little liable to slip as waxed silk, it is not a suitable menstruum for preparing it, for the reasons mentioned above. (3.) The best proportions for the carbolising emulsion are those already given, any larger proportion of the acid impairing the tenacity of the thread. (4.) It is *necessary* to have the small per centage of water added to the mixture, for catgut soaked in a mere oily solution remains rigid, and the oil does not enter at all into its substance, "whereas, the small quantity of water which the acid enables the oil to dissolve renders the gut supple without making it materially weaker or thicker." (5.) "The presence of the water brings about a change in the gut, indicated by a deep brown colour." (6.) Gut thus prepared "may be placed in a watery solution for a long time without swelling, as a portion prepared in a simple oily solution does. This is a great convenience; for an oily solution is unpleasant to work with during an operation, and exposure to the air soon renders gut suppled with water rigid from drying. But when it has been treated in the way above recommended, it may be transferred to a watery solution at the commencement of an operation, and so kept supple without having its strength or thickness altered."

The thickness of the gut used in any individual case will depend on the nature of the case itself, and on the surgeon's views as to the ultimate fate of such a ligature. Mr. Lister says: "For tying an arterial trunk in its continuity, catgut as thick, when dry, as ordinary purse silk will be found best. But for ordinary wounds, where, if one ligature happens to break, another can be easily applied, much finer kinds may be employed, and are convenient from their smaller bulk."

Unprepared gut may be obtained from Mr. Gardner, 45, South Bridge, Edinburgh, for hospitals at 48s. a gross, which equals 144 hanks or skeins, each hank containing one thread of about six yards in length, or about 4d. a hank. The *carbolised catgut* can also be purchased, ready prepared, from Mr. Gardner, the price varying with the size of the gut, and whether or not each hank is wound on a small reel or bobbin. The three smallest sizes, with bottle and oil, cost 6d. a hank each, and the large size, 9d.; but if they are wound on bobbins this increases the price to 9d. and 1s. In the case of hospitals some reduction is made from these charges. It will thus be seen that catgut ligatures are not expensive items in Lister's antiseptic system, and that the essential point in connection with them is to be sure that they have been properly prepared.

Catgut Holders.—With the view of rendering the ligatures portable, and yet at the same time having them surrounded with the carbolic mixture which can alone insure their efficacy, various contrivances have been suggested from time to time for carrying them about. One of the most convenient for placing in an ordinary pocket case was suggested by Mr. Lister himself, and was at first made of glass, but afterwards of silver, and was adapted to one end of the caustic holder in the manner described by him as follows: "For every-day use, a small oil-tight capsule may be carried in the pocket case, and this can be replenished from a larger stock, as may be necessary. I have had a small silver bottle, with well fitting screwed top, adapted to my caustic case, and this contains two little rods of wood, with gut of two sizes wound upon them, with a few drops of the antiseptic oil; and now that torsion has almost entirely superseded the ligature in ordinary wounds, this small supply will probably last me for months." (*Retrospect*, vol. lix, p. 141.) This catgut holder is now made in a separate form by Mr. Gardner, of Edinburgh. The case and winder are made of metal, plated on both sides, and will hold a hank of fine and one of medium-sized gut, so that it contains about twelve yards of ligature, a supply quite adequate for any large operation. Its price is 6s. 6d.

A catgut holder for hospital use, suggested by Dr. F. L. Grassett, formerly a house surgeon with Mr. Lister, has been found to be very convenient and cleanly. It consists of a trough made of strong glass, having a metal cover perforated with three holes, through which the catgut can be drawn. Three reels holding different sized threads of carbolised catgut, being placed on a metal rod in the centre of the glass trough, are partially immersed in the carbolic oil contained in it, so that in the act of drawing any of the catgut from the reel it passes through the solution. It may be obtained from Mr. Gardner, Edinburgh, for 10s.

Method of Application.—The steps of the procedure of applying a catgut ligature to the closure of cut or wounded arteries in open wounds, are really just the same as when any other kind of ligature is used. Lay hold of the orifice of the bleeding artery and pull it out from the surrounding tissues, either with a pair of ordinary artery forceps or with a tenaculum, so that the loop formed by the ligature may embrace the vessel and it alone. Then take a catgut ligature, measuring about two feet in length, encircle the artery forceps with it, and tie it loosely in a knot. Next, carry this knot over the point of the forceps by the tips of the two forefingers so as to embrace the mouth of the artery, and when it is quite down on the artery, tighten the knot so that all pressure is made at the bottom of

the wound. In this way the risk of including the artery forceps in the knot will be very much lessened. There should be no jerking or strong pulling when the knot is being tightened, for a very moderate amount of compression suffices, whereas violent tugging at the catgut may break it, or may displace it from the vessel, or may even cut through its tissues, which in some subjects are very friable. A second knot should then be tied, and in such a way as to make the two knots form what is termed a "reef-knot." Some deem it advisable to add a third knot, and there is no objection to such a course, though it is unnecessary. As soon as the knot is properly secured, *both ends of the ligature are cut off short close to the knot* thus completely abandoning the former line of practice, where it was customary to cut off only one end of the ligature and leave the other hanging out of the wound, that of the main artery being distinguished by a knot tied on it. The reason for this course was that when the sloughing of the arterial coat had taken place the various ligatures could readily be withdrawn. If it be necessary to use a tenaculum, owing to the end of the vessel being difficult to isolate from the other tissues, the steps of the operation are the same as when the artery forceps are employed, care being taken to make the knots *beneath* the instrument, and not over it, so as to allow of its being withdrawn when the tying is complete. These precautions are equally applicable to the cases where it is necessary to ligature an artery in its continuity. The operative proceedings are exactly the same with the carbolised catgut as with a silk ligature, and the same dexterity and care are required.

Whilst the *mode of applying the ligature* is the same in both cases, yet in the one class *there is superadded all the antiseptic precautions which Lister's system necessitates*, and which are at variance with much that was done under the old *régime*, especially during lengthy operations. Thus, each ligature should be cut as required and passed directly to the surgeon through the cloud of spray. If the ligatures happen to be cut before being wanted, they should be placed in some carbolic lotion along with the instruments, and not allowed to lie about on the table or elsewhere. In hospital operations conducted without antiseptic precautions it was not unusual for the house-surgeon to stand opposite the operating surgeon with the necessary number of ligatures passed through the button-hole of his coat, a procedure quite at variance with the spirit and details of Lister's system. Further, the practice of holding a catgut ligature temporarily between the lips, when both hands are occupied, is decidedly objectionable, and one that should not be followed. I allude to points such as these, so that I may not be misunderstood when I

say that the catgut ligature is applied much as any other ligature.

A very great diversity of opinion has existed, and probably still exists in the minds of many surgeons upon that most important of all points, the fate of the carbolised catgut after it has been placed among the tissues of the living body. But it appears to me that this is due to sufficient stress not having been laid upon the condition of the wound in the different cases that have been referred to, and that this is the real explanation of the great discrepancies that have been found to exist in the condition of the catgut when opportunities have occurred for examining it after death. Accordingly, I shall first give the conditions observed in the catgut in *aseptic* cases or those in which putrefaction did not occur, and then those in *septic* cases where putridity was present, and in this way I hope to make the matter clearer and draw from the facts elicited some important practical rules for surgeons.

Influences of the Tissues on Carbolised Catgut in Aseptic Cases.—Although the use of "animal ligatures" is a subject that has at various times engaged the attention of surgeons, the results obtained were so much against them that they had been entirely discarded. The advantage and feasibility, however, of reintroducing them under different conditions presented itself to Mr. Lister, from the experience which his antiseptic system had afforded "of the disappearance without suppuration of large dead pieces of skin and other textures." With these facts before him, he ligatured *antiseptically* in two places the right carotid artery of a healthy calf, a few days old. There was an interval of about an inch and a-half between the two ligatures, and the sheath of the vessel was left undisturbed in the intervening part. In one place strips of peritoneum were used, and in the other fine catgut. The wound healed without any pus, and a month after the operation, the animal, which was in perfect health, was killed, when the ligatures were found to have been transformed into bands of living tissue. "The two pieces of catgut which had been tied round the vessel had become, as it were, fused together into a single fleshy band, inseparably blended with the external coat of the artery." The ligature composed of the strips of peritoneum was in like manner continuous with the arterial walls. A microscopic examination of the parts only confirmed the existence of the organisation which was so apparent to the naked eye, for not only was the ligature incorporated with the tissues of the outer arterial wall, but its substance was invaded and replaced by fibro-plastic material, consisting mainly of long multi-nucleated cells, not unlike fibres in their appearance. From what he saw of the behaviour of the catgut in this case,

Mr. Lister was led to believe that it was removed by absorption, and its place taken by new living tissue, which not only grew at the expense of the dead, but was also formed, as it were, on its mould and pattern. In this way catgut ligatures surrounding arteries might be said to be "transformed into bands of living tissues," which retain the shape of the dead but nutritious masses composing the ligatures. (Lancet, April 31, 1869; *Retrospect*, vol. lix, p. 136.) Some observations made by Dr. W. J. Fleming, of Glasgow, which independently go to confirm those of Mr. Lister, are to be found in the Lancet, for May 27, 1876. Dr. Fleming was anxious to ascertain whether carbolised catgut, when placed among living tissues, "is absorbed, that is, dissolved, taken up, and carried away without leaving any trace behind, in the same way as a soluble crystalline substance introduced into tissues; or whether it is organised, converted into tissue, and becomes a living active part of the body." He placed carbolised catgut, with antiseptic precautions, amongst the tissues of living dogs and rabbits, and at the end of some four weeks killed the animals by bleeding, and injected the vessels with Prussian blue. The results, in his own words were:—"These experiments show that a gradual softening takes place from without inwards, the catgut breaking down and becoming infiltrated with cells, probably leucocytes. This part of the process takes from five days to about twenty, varying with the specimen of catgut, the tissue amongst which it is situated, and the age and vitality of the animal. Next the pultaceous mass into which it has been converted begins to metamorphose, and is soon permeated with blood-channels, and ultimately may be described as a cast of the catgut, a kind of granulation tissue freely supplied with blood-vessels, which in many of my sections are very fully injected." It is clear from this that Dr. Fleming's experiments verify entirely the views at first put forth by Mr. Lister as to the fate of carbolised catgut among the living tissues, "that the dead, but nutritious mass, serves as a mould for the formation of new tissue, the growing elements of which replace the materials absorbed, so as to constitute a living solid of the same form."

Influence of the Tissues on Carbolised Catgut in Septic Cases.—The point of difference between the class of cases just considered and the present ones, is that in the former the healing changes in the wounds progress without the presence of putrefraction, and consequently with freedom from inflammation and suppuration, whereas in the latter putridity occurs, and the tissues of the parts are bathed in putrescent discharges, which are chemically acrid and irritating in their nature. Under these circumstances it is not difficult to understand that the fate of

a foreign body will be very different in the two sets of cases, and that is what we find to be the case. Those who have made trial of the carbolised catgut ligature, without being successful in keeping their wounds antiseptic, have been disappointed with it, finding that instead of being organised, as they hoped, it softened, disintegrated, and disappeared. This is not to be wondered at, especially when we remember that Dr. Fleming's investigations show that the earliest stage in the changes undergone by carbolised catgut in the tissues under *aseptic conditions* is one of softening, no doubt to allow of the penetration of its substance by the elements of the surrounding tissues preparatory to organisation and consolidation. Now, when catgut is in this softened state, if it is brought under the influence of putrid discharges, it will undoubtedly break down, and, as Mr. Lister says, "come away, like the other minute sloughs of cellular tissue which appear along with the pus." (Holmes' Surgery, vol. v., p. 622.) There is no better description of the state of matters that exists under the conditions to which I allude than that given by Mr. Spence in the Lancet for June 5, 1869, where he reports the *post-mortem* examination made in a case of ligature of the right common carotid with a catgut ligature, which was fatal on the third day. "On examining the carotid artery I was not a little surprised to find that it did not seem in the slightest degree constricted at the point of deligation; in fact, at first I saw nothing which I could recognise as the ligature. On careful examination, however, I found that what at first seemed some lymph or tissue, was the catgut softened. The circle of the ligature had given way apparently on the side of the vessel nearest the trachea, the entire knot being connected with the end of the ligature, which was visible. On looking at the ligature with a pocket lens, the texture of the gut was distinctly seen, but it was so gelatinous and pulpy that it seemed as if it were cast in gelatine, and a portion removed for microscopic examination when placed between two slips of glass, spread out like a fluid." Hence, Mr. Spence concludes, "that catgut, however prepared, is liable to become altered, softened, and disintegrated by the heat and moisture of the living tissues around it," and I am inclined to think that his surmises are correct *when they apply to wounds not managed according to Lister's system*, and where the catgut has been very hurriedly, and consequently imperfectly, prepared (as was the case with that used by Mr. Spence), for the longer it has been in the carbolic emulsion the better able will it be to resist the influence of septic fluids. Of course we may have instances in which even in wounds treated without antiseptic precautions the catgut will behave as it does in aseptic wounds; but they are really so in their nature, at least in their deeper parts which

have chanced to unite by first intention. Indeed, there seems to me nothing wonderful in the catgut undergoing different changes when placed under different surroundings, and the aim of surgeons should be never to let it have the chance of coming under conditions that are known to be unfavourable to it, and render it unreliable as a hæmostatic. Even Mr. Lister admits that though in *septic* wounds there is probably no more risk with it than with other ligatures, yet that is not absolutely safe, but I am sure that he would not advise its employment for ligaturing an artery in its continuity, unless under all the antiseptic precautions of his system.

Points of Surgical importance connected with Carbolised Catgut.—(1.) In the antiseptic ligature of arteries in their continuity, the wounds heal at once without inflammation and suppuration, because there is no ligature to come away. Mr. Lister, speaking of the antiseptic ligature of arteries, says:—"One point brought out in striking relief is, that a portion of dead tissue is not necessarily thrown off by suppuration, but, unless altered by putrefaction, or artificially imbued with stimulating salts, serves as pabulum for the surrounding parts, which remove it by a sure process of absorption. Hence the death of a portion of the external coat included in the ligature does not of itself render it a cause of suppuration." (2.) It does not seem necessary that the inner coats of the artery must be cut through, so as to set up a *reparative* process in the shape of "adhesion" of the divided surfaces. As Mr. Bickersteth says:—"In Mr. Lister's case of the calf there was no division of the artery, the middle and internal coats were simply blended together, so as to obliterate the cavity of the artery without any solution of continuity." (3.) The antiseptic catgut ligature applied round an artery, instead of weakening it, really strengthens it. To quote Mr. Lister's words: "It appears, then, that by applying a ligature of animal tissue antiseptically upon an artery, whether tightly or gently, we virtually surround it with a ring of living tissue, and strengthen the vessel where we obstruct it." (4.) To obtain the full advantages of carbolised catgut *ligature it is imperative to carry out all the details of Lister's system.* To employ the catgut without these is only to court failure and disaster. For it is only under the conditions gained by antiseptic management that the absorptive and organising changes go on which give to catgut such great value; whereas, where the fluids in a wound are putrescent, these changes seem to be overcome by the altered conditions present, and the ligature not only breaks down but becomes imbued with the septic discharges, and acts as an irritant leading to inflammation, suppuration, and perhaps sloughing. Mr. Lister's teaching on this point is plain:—"The surgeon, therefore, may

now tie an arterial trunk in its continuity close to a large branch, secure alike against secondary hemorrhage and deep seated suppuration—provided always that he has so studied the principles of the antiseptic system, and so carefully considered the details of the mode of dressing best adapted to the particular case in hand that he can feel certain of avoiding putrefaction in the wound." (Lancet, April 3, 1869.) (5.) Though the use of carbolised catgut in septic wounds is not advised, yet it would seem to be quite as efficacious as other ligatures, and this view is supported by some experiments which Mr. Lister carried out to test the value of the catgut under septic conditions. (6.) Mr. Lister thus briefly sums up the merits of the catgut ligature when used *under antiseptic precautions*:—"The catgut, as tied in the ordinary reef-knot, with the ends cut short, seems to me to be a perfect hæmostatic. It has all the simplicity and universal applicability of the ligature, with, at the same time, the virtual absence of any foreign body from the wound." (British Medical Journal, Aug. 26, 1871.)

Other Uses of Carbolised Catgut.—Carbolised catgut may be employed in antiseptic surgery in various ways in addition to its use as a ligature, for instance, as a drain for wounds, and, under certain conditions, as a suture, allowing us to deal with cases that previously were beyond the range of successful operative interference. Mr. Lister has himself given instances of this in the satisfactory treatment of two cases of irreducible hernia. Since then, the experience of others has gone fully to confirm Mr. Lister's statement, "that the catgut stitch becomes a new engine in surgery, enabling us to attach deeply seated parts to each other, leaving the connecting medium to be removed by absorption." (British Medical Journal, Aug. 26, 1871.) It is also clear to any one impartially studying the whole of the facts that have been revealed by Mr. Lister's labours, that the introduction of the carbolised catgut *under antiseptic precautions* has not only widened the field of surgery, but has greatly tended to enlarge our ideas of life, especially as carried on with its ever changing restlessness in the hidden tissues of our frame. And it seems to me that surgeons of the present day have obtained what their predecessors frequently strove after, and found beyond their reach, but the desire for which took expression in their writings, as when we find Sir Astley Cooper saying:—"It would be an extremely desirable thing if any person invented a ligature composed of materials which would admit of solution; he would, by such an invention, greatly serve his profession." (Practice of Surgery.) The hope expressed in these words has been more than realised. Mr. Lister, by his carbolised catgut, has not only greatly served his profession; but by it he has also immensely benefited mankind.—*Glasgow Medical Journal, July* 1880, *p.* 14.

38.—LISTER'S ANTISEPTIC METHOD OF TREATMENT. ON ANTISEPTIC SUTURES.

By Dr. GEORGE BEATSON, B.A. Cantab., Glasgow.

[In his previous papers Dr. Beatson has treated of the substances used as lotions and the materials employed as dressings in Lister's antiseptic system. He here speaks of the means of ensuring union in antiseptic wounds.]

The term *suture* (Latin *sutura*, a seam), when used in anatomy, indicates the line of junction of different bones, but in surgery it is applied to the materials used for stitching wounds, so as to maintain the opposing surfaces in contact, and thus secure union with freedom from any scar, or at all events with the smallest possible cicatrix. The materials recommended and used for this purpose have varied from time to time, but in Lister's antiseptic system there are only four with which we need concern ourselves. They are *wire*, *silk*, *catgut*, and *horse hair*. I may here briefly allude to a substance which can hardly be reckoned a suture (though by the older surgeons it was termed "dry suture"), but which is sometimes employed for bringing together the edges of wounds, or affording them support so as to prevent any strain upon the tissues. I refer to adhesive plaster.

Adhesive Plaster.—Of the different plasters used in surgery the one to which the term *adhesive* is usually given is the ordinary strapping or sticking plaster, known also by the name resin plaster, as it consists of a compound of resin, litharge, and soap, spread very thinly on one side of light calico, the resin being added to render it sticky on the application of heat, and thus cause it to adhere.

The following are Mr. Lister's directions as to the manner of using it. Speaking of the dressing of an amputation and of the tendency that the flaps sometimes show to retract, he says:—"If strapping is required, common adhesive plaster may be rendered antiseptic by dipping it for a second or two in a watery solution of the acid, and it is most convenient to have the lotion hot (say one part of one to twenty with two parts of boiling water), so that the strap is warmed at the same time by its immersion. It can then be applied effectively under the spray, which should always be used in changing the dressings of a stump till the wound has become superficial." (Holmes' Surgery, vol. v., p. 624.)

Wire Sutures.—The experience of surgeons has quite borne out the unirritating character of silver wire as a suture; and though the great objection to it is the difficulty of its removal, yet it is very generally adopted, especially in plastic operations. Mr. Lister says of it:—"I am happy to be able to confirm

fully the original statement made on this subject by Dr. Sims, of New York, to whom the profession is indebted for demonstrating the value of the metallic stitch." (Holmes' Surgery, vol. v, p. 614.) Sir James Simpson recommended "iron wire" for sutures, both for its physical qualities and also its cheapness, the roll of 100 yards only costing 1s.; and at one time it was very much used in Edinburgh, and also in the country, but it has now fallen more into disuse, as the experience of metropolitan and provincial surgeons has been against it, and the silver wire has taken its place. This latter material is of two kinds. There is, first, the pure silver wire, made in three sizes—small, medium, and thick, costing respectively 8d., 10d., and 1s. per yard, or 10s. 6d. per ounce; and then there is another variety, consisting of copper wire plated with silver, and termed "copper silver-plated wire," which is also made in three sizes, and is very much cheaper than the first kind, costing only 6d. an ounce, or 1d. per yard, for any of the sizes. Some surgeons use the last kind, but it has not the pliability of the pure silver, and from the presence of the copper is liable to oxidation among the tissues, so that the majority of surgeons, and among them Mr. Lister, prefer the variety composed of pure metal as in every way more suitable for sutures. Silver wire is made from ingots of silver, whieh are shaped into rods by drawing the red hot metal between grooved rollers. These rods are then reduced to the form of wire by being, when cold, drawn by powerful machinery through holes in a plate composed of hardened steel, the holes decreasing in size gradually, and being round, oval, or square, according to the shape desired. To remove the brittleness caused by this great compression, the wire requires frequent annealing or tempering, just as glass does, and, indeed, it is said that silver wire, if kept long, loses its softness and pliability, and becomes unfit for sutures. It may be reannealed at any time, and, best of all, just before it is required for use. The wire, though mechanically antiseptic, is rendered aseptic at the moment of application by dipping it and its needle into the carbolic lotion, and inserting the sutures under the spray, just as in the case of the strips of adhesive plaster.

Carbolised Silk Sutures.—Admirable as wire is for certain cases, yet its rigidity, and the fact that all metallic sutures are apt to catch in the antiseptic dressings, led Mr. Lister to take steps for introducing the ordinary surgical silk into his system, and this he was enabled to do by having the silk *carbolised*, by which process the interstices among the silk are filled up with wax and carbolic acid. Prepared in this way carbolised silk showed itself preferable to catgut as "less amenable to absorption," and "very superior to wire, not only on account of its

perfect suppleness, but because its actively antiseptic character ensures absence of putrefaction in the track of the stitch." Carbolised silk is composed of ordinary surgical silk impregnated with a mixture of ten parts of bees' wax and one part of carbolic acid. There are several varieties of surgical silk. This silk is specially made for the purpose, and differs from that in the ordinary shops by being pure white, and free from all colouring matter. Silk, in its raw condition, has rather a yellow look, and is somewhat gummy, but this is got rid of by boiling and subjecting it to the action of alkalies, which give it a white appearance. One kind of silk, a good deal used in surgical work, is that known as *purse silk*, which is a strong, evenly-twisted thread, introduced some years ago for netting purses, its recommendations being the perfect regularity of its twist and its strength. There are three sizes of it, coarse, medium, and fine. More recently, Messrs. Turner & Co. have brought out a modification of this silk, which consists in having it *plaited*, whereby its strength is said to be increased and it loses all tendency to kink or curl as the ordinary silk is apt to do. There are seven sizes of it, but numbers 1, 3, 5, and 7 are the most convenient for every day use, and they are furnished together on a tablet in a sheath. This plaited silk has found a good deal of favour with surgeons on account of the qualities mentioned above, and because of its freedom from all colouring or dressing material. There is one other variety of silk which has been somewhat extensively used of late, especially by ovariotomists as Keith, Wells, and Thornton, *Chinese silk*. It is so termed because it is composed of Canton silk, which is one of the lowest class of Chinese silks, and is the variety chosen for making dentists' and surgeons' twist on account of its cheapness—the European silks being much too expensive for that purpose. There are three sizes of Chinese silk, and they are all characterised by the closeness and firmness with which they are twisted. It is this that gives them their strength, which is their marked feature. As the basis, then, of his carbolised silk, the surgeon may select any of the above varieties, according to his inclination, for one answers as well as the other, and if he considers the question of expense, he will probably find the difference between the various kinds very small in amount, as they nearly all cost about a shilling per hank of twelve yards.

For *preparing carbolised silk*, the first thing to be done is to melt, in a jelly can, ten parts of bees' wax and one part of carbolic acid. Half an ounce of the latter and five ounces of the former is a very suitable quantity to employ at one time. Place the jelly can containing them in a saucepan with some water in it, and let it stand on the hob near the fire. To pre-

vent volatilisation of the acid, cover the jelly can with a piece of sheet lead or stiff paper, perforated with a hole in the centre large enough to allow the silk to pass through. As the melting proceeds, mix the ingredients thoroughly together. Wind the hank of silk to be carbolised on a reel, and when the wax and acid are well melted, plunge the reel into the mixture, keeping the end of the silk out and passing it through the hole in the sheet lead or paper from within outwards. After boiling the reel and silk in the mixture for half an hour, remove the saucepan from the fire, and proceed to withdraw the now carbolised silk. This is accomplished by grasping the silk with a cloth between the finger and thumb of the left hand, close to the lid on the can, and slowly drawing it through with the right hand. In this way the superfluous wax is removed from the silk, which should then be wound on a fresh reel or plate, and to ensure its retaining its antiseptic property, if kept up for any time, it should be wrapped up in a bit of carbolised gauze, or placed in a tightly-fitting stoppered bottle. Silk prepared in this way will be found to be quite saturated with carbolised wax, and to possess all the unirritating qualities of wire with the softness and other advantages of silk. Any of the mixture of bees' wax and carbolic acid that may be over can be covered up and kept for future use, as it can be remelted at any time, and thus is always at hand. If necessary, a little fresh carbolic acid can be added on any of these occasions, to replace any lost by volatilisation. Though the preparation of the carbolised silk is neither a difficult nor a lengthy process, yet the surgeon will find it a saving of time to purchase it ready prepared, as it is not a very expensive item. It costs about 1s. 4d. per hank of twelve yards for any size, with a certain percentage off to hospitals. It can be obtained from Mr. Gardiner 45, South Bridge, Edinburgh, at that price, though I think he keeps prepared only a thick and a thin variety of silk, as being the sizes most generally useful. Should any surgeon desire to prepare the silk for his own use, he can employ either the absolute phenol or the No. 3 acid, but as regards the bees' wax, I would advise him to use the *white* variety. Bees' wax occurs in two forms, the yellow and the white. The yellow is got by melting the comb in water, after the removal of the honey, and separating by straining any impurities that may exist; while the white variety is obtained by exposing the yellow kind to moisture, air, and light, and thus bleaching it. The white is the purer of the two, and costs 2s. 6d. per pound, while the other is 1s. 10d. Sometimes the white bees' wax is adulterated with suet, and then it loses the hard feel it ought to possess, and is somewhat unctuous to the touch. Bees' wax is selected for carbolising the silk on account of its blandness,

and because it fills up all the interstices of the silk. In its natural condition under the microscope silk presents the appearance of an even cylindrical fibre, destitute of external structure; but the bees' wax actually smooths it down and renders it mechanically less irritating. Further, bees' wax holds the carbolic acid with a certain degree of tenacity, and it is not displaced by blood as soon as the silk is passed through the tissues, as would probably be the case if carbolic oil were used to render it antiseptic.

Catgut Sutures.—These are sutures made of the carbolised gut used for ligatures, and very serviceable they are for cases where they are suitable, but they are very soon absorbed and they will not last beyond a few days. As Mr. Lister says:—"Any one desirous of convincing himself of the absorption of catgut has only to employ it for sutures, and treat antiseptically, and in a few days he will find the knots come off with a touch, the part of the stitch embedded in the tissues having disappeared. This circumstance renders the catgut unfit for sutures intended to retain their hold for a considerable period." (Holmes' Surgery, vol. v., p. 623.) It is, however, this power of being absorbed that has given catgut its wide range of utility, especially for uniting deep-seated tissues, where it can be cut short and left undisturbed, the parts above it being allowed to heal. I alluded in my last paper to two cases of irreducible hernia, treated by Mr. Lister, which illustrate this point, and confirm his statement, "that the catgut stitch becomes a new engine in surgery, enabling us to attach deeply seated parts to each other, leaving the connecting medium to be removed by absorption." (British Medical Journal, Aug. 26, 1871.)

Horse Hair Sutures.—Horse hair, from its length, elasticity, and strength, has long been extensively used in manufacturing a variety of materials. Its qualities of length, toughness, and elasticity, of themselves render horse hair suitable for surgical work, but it has others to recommend it, apart from its cheapness and the facility with which stitches of it can be removed. I refer to the little tendency it has to absorb fluids, and to the smoothness of its surface. Mr. Lister thus alludes to these characteristics of horse hair when speaking of plastic operations on the face. "In operations of this kind, silver wire for the deeper stitches, and horse hair for the superficial ones answer extremely well; the rigidity of the wire enabling it to give valuable support, while both these kinds of material are mechanically antiseptic, since they afford no nidus for putrefactive fermentation in their substance, and both are so smooth in surface, as to be in that respect quite unirritating. For, microscopic examination of horse hair shows that its external epithelium, unlike the imbricated arrangement which prevails

in many hairs, such as those of the mouse or of the human head, is so arranged as to produce perfect smoothness, a circumstance which is probably further valuable from the facility with which adhering dust can be removed." (Lancet, June 5, 1875.) As to the colour of the horse hair we employ for sutures it is immaterial; but Mr. Lister gives the preference to black, and his reasons for so doing are contained in the following quotation from a lecture given by him on excision of the knee:—"I used white horse hair in this case simply because I did not happen to have at hand any of the black, which is generally preferable. because the individual hairs are thicker, while the dark colour has the advantage of making them more conspicuous, especially when they are used for sutures." (Lancet, Jan. 5, 1878.) To render horse hair antiseptic it merely requires soaking for a few minutes in one to twenty carbolic lotion. If placed in some of that lotion at the commencement of an operation it would be quite ready for use when the time for stitching had arrived. Some consider it advisable to remove from the horse hair any grease by steeping it in an alkaline solution, but this is quite as unnecessary as cleansing the skin, previous to an operation, with soap and water followed by ether. The one to twenty lotion will render it perfectly safe as regards freedom from putrefactive agencies. The best hairs for surgical work are those from the tail of a stallion, and, as a rule, horse hair is most satisfactorily obtained from some fishing-tackle maker.—*Glasgow Medical Journal, Sept.* 1880, *p.* 197.

ALIMENTARY CANAL.

39.—ON THE OPERATION FOR THE RADICAL CURE OF CONGENITAL INGUINAL HERNIA IN THE CHILD.

By Dr. GEORGE BUCHANAN, M.A., Professor of Clinical Surgery in the University of Glasgow.

Professor John Wood's operation for the radical cure of inguinal hernia in the adult is, on the whole, so successful and so free from danger, that I am surprised so few of the many hundreds affected with hernia in every community seek the relief it affords. I presume it is because there must always be some hesitation in accepting the present risk, however small, which accompanies an operation; and a hope that the much greater danger of strangulation may never occur. But in the case of young boys the risk arising from an operation is much less. I think it has been shown that the peritoneal cavity, especially under antiseptic precautions, may be opened with impunity. But even this risk is, in Mr. Wood's plan, not encountered; and it seems to me strange that boys who have a

congenital hernia which cannot be kept permanently reduced by any apparatus—a state of matters which every hospital surgeon sees repeatedly—should be allowed to grow up with a deformity which prevents them being useful and happy members of society, and debars them from a great many employments.

I confess, however, that I have been disappointed with the results of my attempts to cure congenital hernia in children by Mr. Wood's operation with pins used subcutaneously. Either I did not succeed in pushing them through the anatomical structures I intended, which is so easy to do in the adult with the strong curved needle, or I failed to lock them and twist them, as it is necessary to do; but, from whatever cause, in the two cases I operated on the result was unsatisfactory. The hernia came down as soon as the pins were taken out.

I determined, therefore, to perform an operation consisting of opening the sac and obliterating the canal by the introduction of strong sutures. The steps followed will be best understood by the report of a case which formed the subject of a clinical lecture.

Robert Inglis, aged sixteen months, was the subject of congenital inguinal hernia, which was observed shortly after his birth. It was small when first noticed, but soon increased in size; and it had grown with his growth. It was on Jan. 9, 1879, about the size of a turkey's egg, and distended the left side of the scrotum. It could be reduced with ease; but it as easily slipped down, and no apparatus or bandage could retain it in its place. Trusses had been tried at various times; but no sooner did the child move, than the hernia came down. On returning it into the abdomen, the finger was readily pushed through the inguinal opening; but even then, unless pushed far up, the bowel slipped down alongside of it.

Before performing any operation, I accustomed the little patient to the pressure of a bandage. I returned the bowel, and applied a large thick pad, which was bandaged very firmly with a figure-of-eight bandage round the groin. This retained the hernia in its place for some hours; but the movements of the child and repeated fits of crying brought it down usually within twenty-four hours.

On Jan. 25, 1879, I performed a radical operation as follows. The patient having been put under the influence of chloroform, the rupture was returned and kept up by the finger of an assistant. A longitudinal incision was made along the whole length of the sac, from opposite the internal ring to the bottom of the scrotum. This divided all the textures down to the peritoneal sac, which, as usual, had been thickened by the presence and movements of the hernia. With the handle of the knife and a few touches of its point, I separated the sac

from its superficial structures, leaving the posterior part lying over the cord, which was seen behind. I now divided the sac into two halves by a transverse cut, except at the back, where it was adhering to the cord. One half was folded down over the testicle, so as to form a sort of *tunica vaginalis*. The upper half was rolled into a sort of ball or plug, which I pushed into the internal abdominal ring and had it kept there by the assistant. I now approximated the walls of the inguinal canal much in the same way as in the wire-operation for the radical cure of hernia in the adult. Having previously pushed aside and slightly dissected the superficial structures from off the abdominal aponeurosis, the relations of the rings and the canal could be felt and in great part seen. I took a strong nævus-needle, and pushed it through the external pillar of the canal at a spot opposite the internal ring; then, guiding it with the point of my left forefinger lying in the internal ring, I made it lift up the lower border of the internal oblique muscle, and emerge through the internal pillar of the external aponeurosis about half an inch above its lower edge. A strong waxed silk thread was now passed through the hole at the point of the needle, which was then withdrawn, pulling the thread with it. The thread was then tightly tied, including the structures through which the needle had been passed, and so fixing into the internal ring the rolled-up bit of the sac, care being taken that the external raw surface of the sac should be turned outwards toward the integument which was to cover it. A little below the first stitch, a second was introduced in the same direction, care being taken to avoid the structures of the cord which lay at the bottom of the wound. The edges of the external ring were now drawn together tightly above the cord by a strong silver wire; this was made to take a very strong hold, by passing the needle first through the external pillar, across the ring, and through the internal pillar. In making the internal puncture, I passed the point of the needle so far towards the linea alba as to make it pierce from below the tendon of insertion of the rectus muscle, so as to give a firm hold. When the wire was drawn through with the needle, it was clamped, so as to squeeze together the boundaries of the external ring; and it was retained in that position by a little rod of silver with a hole at its point, through which the two ends of the wire were passed; and, having been drawn tight, they were fixed by a turn round the rod. The silk threads were clipped short; and the wires, with the little clamping rod to which they were fixed, were allowed to hang out at the bottom of the wound. The edges of the incision were now united with the thin silver-wire sutures, and the wound dressed with antiseptic precautions.

The child was placed on a St. Andrew's cross, the upper arms of which were joined by a sheet of calico on which the body rested; the legs being securely bandaged with strips of adhesive plaster to the lower limbs of the cross. The pelvis and chest were also securely fixed to the apparatus. In this way the movements of the child were effectually controlled.

Two days after the operation, the scrotum was swollen, as if a portion of hernia had escaped from beneath the bandages; but this proved to be only a soft fluctuant swelling, probably an effusion of serum into the artificial tunica vaginalis, which had been formed by the folding down over the testicle of the lower half of the hernial sac, as described in the operation. In two days this swelling had disappeared, and the scrotum was in its natural state. On the fourth day after the operation, the wound was dressed. It was found almost united, except in the place where the wires were left hanging out. On the tenth day, the little clamp and wire were removed, and the parts were found quite matted together.

It is unnecessary to detail the further progress. The dressings were changed every two days, and at the end of four weeks cicatrisation was practically complete. The child was then freed from restraint; but, for precaution, a bandage was still applied round the groin.

May 1st. At this date the radical cure of the hernia is perfect. No amount of exertion either of the limbs or on crying has the slightest affect on the inguinal region of the abdominal walls.

The result has exceeded my expectations, and I shall not hesitate to practise the operation in all similar cases, and even to adopt it as a means of accomplishing a radical cure in cases of strangulated hernia in which an operation for the relief of strangulation has become necessary.

Modification.—Since the foregoing account was written I have operated on two cases, with an equally satisfactory result. The operations were both done on the 16th of May. One was on a boy, aged two years, with double hernia—that on the right side being large, and very troublesome. The other was on a boy aged thirteen months. In both cases unsuccessful attempts had been repeatedly made to retain the hernia by a truss.

The operation was done in exactly the same way as described above, only that, instead of silk threads and a silver wire being used, all the three sutures were of catgut prepared with chromic acid—which remains tough much longer than that prepared with carbolic acid. Of course, the ends of the ligatures were cut short.

Some cellulitis of the scrotum took place, followed by granulation and cicatrisation; but I am not sure that this is not an

advantage; for the integuments in the groin are firmly matted to the subjacent tissues, and the inguinal canal is strengthened by this intimate adhesion of all the structures.

At this date, June 20th, the radical cure is perfect in all the cases.—*Dr. Buchanan's Pamphlet.*

40.—ON THE TREATMENT OF HEMORRHOIDS BY CRUSHING.

By George Pollock, Esq., F.R.C.S. Eng., Surgeon to St. George's Hospital.

The more recently adopted mode of treatment by clamp, scissors, and actual cautery, though, perhaps, somewhat less painful, is still sufficiently severe to occasion much subsequent suffering, and often for some days. A burnt wound must in most cases be attended by more pain, heat, and discomfort than a clean-cut surface: œdema, retention of urine, spasm of sphincter, bearing-down pain in the rectum, are all more or less the common accompaniments of both these methods of treatment.

It is but right, however, that I should quote shortly the opinions of Mr. Curling on the comparative merits of the two operations. His experience in the treatment of hemorrhoids, is perhaps not excelled by anyone, while his judgment must be respected by all. Mr. Curling says: "Considerable difference of opinion exists as to which operation, the cautery or the ligature, is the best on the score of freedom from suffering, safety, and speedy recovery without confinement. As respects after-pain there is little to choose if care be taken to incise freely before the ligature is applied, and both operations are equally free from danger. The advocates of the cautery have, it is true, magnified the risks of the ligature. But after a lengthened experience I can state that, with one exception, no fatal case of operation by ligature has occurred either in my public or private practice. In 1868 a man aged fifty-two, upon whom I had operated in the London Hospital for internal piles, and afterwards for fistula, was seized with pyæmia, followed by numerous abscesses, and, after a protracted illness of five months, died. Erysipelas and pyæmia have also followed, though very rarely, the operation by cautery. Some amount of danger must be incurred in every kind of operation, serious results sometimes arising from the slightest causes, and the removal of piles cannot be expected to be exempt from risks which may attend a trifling puncture of the finger." "I continue to give the preference to the ligature, as more convenient to the surgeon and less alarming to the patient. The operation by cautery is more tedious than by ligature, a matter of little moment when the patient is insensible, and special care is

necessary in using the cautery to guard against after-hemorrhage. In a favourable case the patient is able to leave the couch somewhat sooner, and recovery is, on the whole, somewhat more rapid than after ligature, as the healing of the sores does not commence till after the separation of the ligature, a process occupying four or five days, whereas the eschar or superficial slough produced by the cautery is cast off sooner."

In considering whether any modified process, likely to be followed by less pain, could be substituted for the methods already alluded to, while at the same time perfect relief could be equally ensured, it occurred to me that any thorough and instantaneous destruction of a part is usually comparatively painless—in the injury itself and in its sequence. A heavy weight falling on a finger or toe, and completely crushing the part, is seldom attended by much pain then or subsequently. Nor under such circumstances does much bleeding occur. A man hit by a bullet in soft tissues is known to have been ignorant of the receipt of the injury until the trickle of blood is observed in the neighbourhood of the wound, and thus it occurred to me that if a pile could be rapidly and effectually destroyed at its base by some instrument which in its action would be analogous to that of crushing the part included in its bite, the vessels of the crushed portion would not be very liable to bleed when the surface of the pile was removed, and the nerves being bruised by this proceeding would be less liable to be followed by pain.

It is now some two or three years since I commenced to put in practice these views. The earlier attempts to crush the base of the pile were occasionally partial failures as regarded the perfect freedom from hemorrhage. Either from want of proper construction the clamp did not effectually spoil the tissues at the base of the piles; or perhaps from too much of the protruding mass being taken up at a time to enable the clamp to act efficiently, or from some other unexpected cause, some bleeding would occur after the clamp was removed, the pile having been cut away; and this had to be dealt with by ligature. Seldom, however, were more than two or three ligatures necessary, and never was troublesome or recurring hemorrhage encountered. As successive cases continued to be treated in this manner, any defects of the clamp became manifest, and gradual improvements were made. Still the theory, that crushing the base of the pile should entirely obviate the occurrence of hemorrhage on the separation of the pile and subsequent removal of the clamp, was not as yet fully realised by the results. Sometimes we had no bleeding; sometimes three or four vessels might be required to be ligatured. But still the one satisfactory result observed in all cases thus treated was

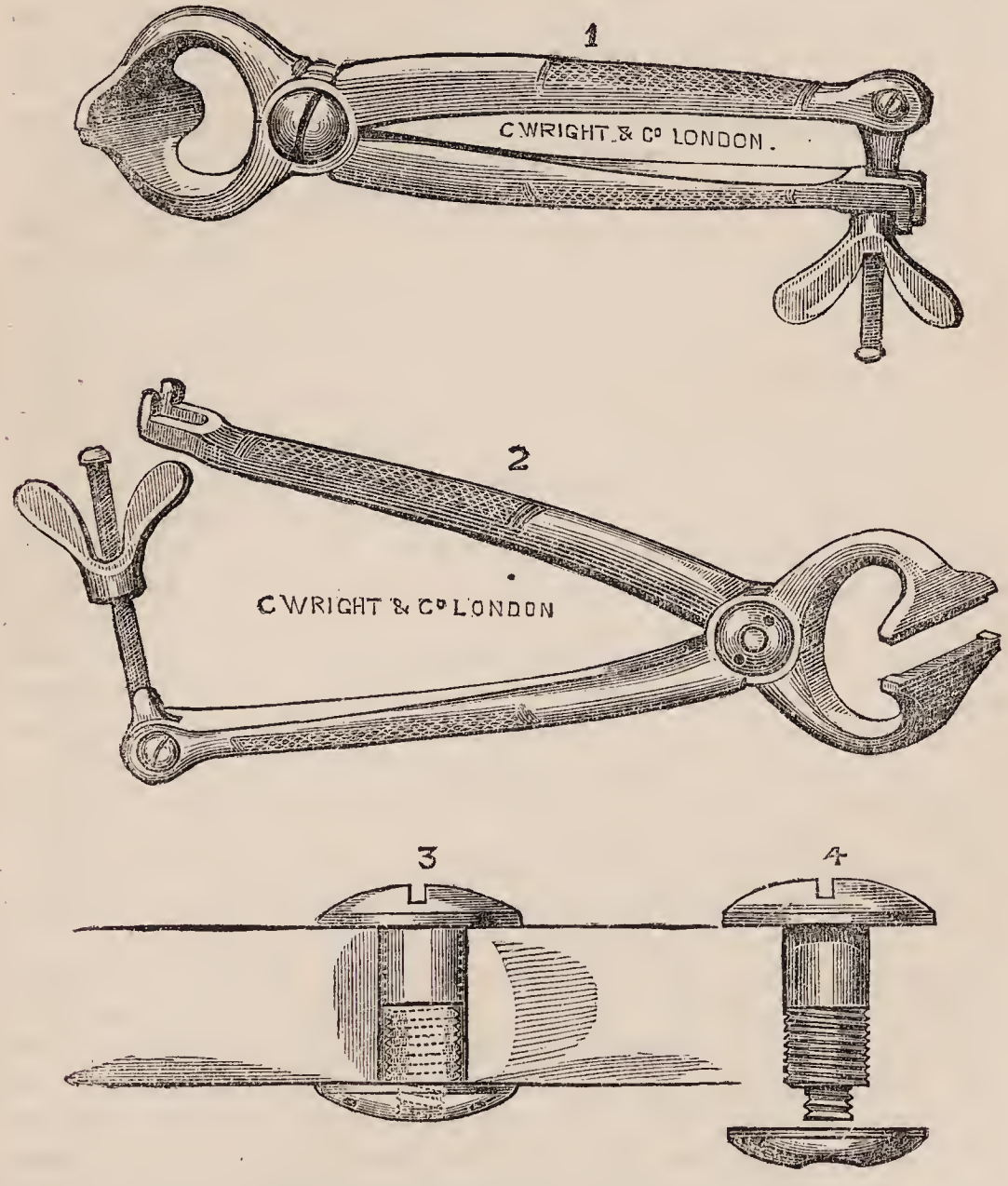
that the subsequent pain was quite an insignificant matter. It is not wished to imply in this statement that no one ever complained of pain; but in contrast to the pain attendant on ligature, or that noticed after the application of the hot iron, certainly that which has been observed after this system of rapid crushing, may almost be said to be a *minus* quantity. One patient complained of pain for about three hours. In all cases patients have expressed themselves free from severe pain, and many have hardly complained of any after an hour or two. One, who had some years previously undergone an operation by ligature, expressed his extreme gratification at the almost entire absence of even discomfort after the first effects of the ether had gone off.

The application of the heated iron to the surface of a fresh cut wound must not only necessarily make it a very painful one, but burning the surface necessarily converts it into a more extensive slough, which has to be thrown off before healing commences. The slough to be shed after the application of the clamp now used by me, is very thin and quite superficial, and is soon cleared away. The œdema following this method of relief is but little compared to that which is often observed to follow the application of the ligature or the cautery. Having now tested all these methods of treatment not a few times, I cannot but express my very strong conviction that, compared with the results of ligature or cautery, the pain and subsequent discomfort after crushing are really trifling. But apart from the question of pain or bleeding, the operation itself is rendered very simple by the use of this kind of clamp, and in that point alone we venture to think it will be considered an improvement by those who care to test it for the removal of hemorrhoids.

Messrs. Wright and Co., of New Bond Street, and Messrs. Weiss and Co., of the Strand, have made several clamps for me, each being some improvement on the last; but the most perfect, and that now used, was made by Messrs. Wright, at the suggestion and under the superintendence of Mr. Benham, at present a pupil at St. George's Hospital. His mechanical skill has not only been the means of effecting improvements in this and other instruments, but gives promise of great service in many respects, as a thoughtful and successful inventor. His own description of the clamp is appended, and will be readily understood with the aid of the illustrations given herewith.

The process of the application of the clamp remains to be described. The patient suffering from hemorrhoids, being prepared for the operation in the usual manner, is to be placed under the influence of ether. He is then turned on his left side; the right leg to be well flexed and fixed with a strap, which is

to be carried under the knee and round the neck. The pile to be removed is to be drawn well down by pronged hook, or forceps. The clamp is then to be applied to the base of the



pile, and at once tightly and firmly closed by the action of the screw at the end of the handles. The portion of pile which protrudes *inside* the lips of the clamp is then to be removed by a pair of curved scissors. The clamp may afterwards be retained, still grasping the stump of the pile for any time the operator may consider desirable. Our usual custom is to retain it from half a minute to a minute. If the pile be large and thick it may be well to retain it for a rather longer period. This process is, of course, to be repeated according to the number of masses to be got rid of.

Since this last clamp has been used, one or two little vessels have bled after the base of the pile was relieved from the grip of the instrument; nothing more, however, than would have ceased without interference in a short time. But to keep the patient clean, and to avoid giving any cause for uneasiness, a ligature had better always be applied at once to any suspicious bleeding point rather than run the risk of its continuance. A ligature applied under such conditions is known not to cause any subsequent pain, and in its effects is not to be compared for a moment to the pain occasioned by a ligature placed through or round a pile. In fact, pain, as already mentioned, is not often complained of when the patient has recovered from the effects of ether, even though two or three ligatures may have been applied to as many bleeding points. It is better, however, to avoid all risk of bleeding by securing any continuous oozing point. Every surgeon familiar with operations connected with the lower bowel is aware of the necessity of proper respect for any trifling point of bleeding, and it is far better to secure it while the patient is quiet and under the influence of ether, than to run the risk of having to attend to it later. Still it will generally be found that very little is required in this respect after the pile has been thoroughly crushed by the forceps described. In the various cases as yet so operated on, no such accident has followed; but on the principle that it is always better in surgery to avoid a difficulty than have to overcome one, we recommend the securing of any suspicious bleeding point than to run the risk of its continuing to bleed, or trusting to the chapter of accidental arrest.

Having now tested this operation in many cases of hemorrhoids, and feeling satisfied that, as regards pain, it is preferable to treatment by ligature or cautery; that as regards its efficiency, it is equal to either; and as regards the operation, it is essentially simple and satisfactory, it is but right that it should be brought more generally to the notice of the profession than can be done by its performance alone in the operating theatre of St. George's Hospital, or in the smaller sphere of private practice. The experience of not a few years in hospital work will perhaps be some justification for my venturing to recommend an operation which to my mind presents a simplicity that places it within the reach of any practitioner, and at the same time renders it one of far less suffering to the often too sensitive patient who may be the subject of hemorrhoids. I need only add, that the subsequent dressing employed after the operation is completed, is as simple as the operation itself. "Tarred cotton," as prepared by Messrs. Bell & Co., of Oxford Street, or that prepared with salicylic acid, with warm bathing,

is the only local application employed until the sores are healed.

The following are Mr. Benham's remarks on the construction and mechanical advantages of the clamp:—"1. It is so constructed as to form a multiplying double lever of the first kind, the fulcrum being formed by the joint, the resistance by the tissues acted on, and the power by the thumb screw at the other extremity of the clamp. 2. The parallelism of the jaws is governed by the joint; for the former being situated in close proximity to the latter, any appreciable lateral spring is prevented, especially as the substance of metal forming this part of the structure is of great strength—hence all the strain is thrown upon the joint—the construction of which is as follows: The opposing surfaces are of large size, are accurately fitted together, and are connected by a lock-nut, so that it is almost impossible for the jaws to spring from their parallelism in the slightest degree. 3. The opposing surfaces of the jaws are *not horizontal*, but are inclined at an angle of 45°, which has the following advantages—(*a*) Besides a jamming, there is a grinding movement; (*b*) The power in overcoming the resisting forces is represented as two equal forces, acted upon by their resultant at an angle of 45°; (*c*) By this inclination it pulls the surface of the bowel close to the jaws—this being an immense advantage, especially if the operator be unable to draw the tissues, to be acted upon, close to the opposing jaws. 4. That portion of the clamp which forms the handles is so constructed as to admit of a slight spring or elasticity, when the screw is firmly applied, has the following advantage—namely, if, when the clamp is first applied to the tissues, they do not yield, they may be made to do so by the gradual crushing power which is brought to bear by the elastic recoil of the handles.

"The following is a rough estimate of the mechanical advantages gained, the calculation being somewhat under than above the estimation:—1. The extremity of the handles being four times further from the fulcrum than the jaws, an advantage is gained of four to one. 2. The screw which is attached to the extremity of the handles having a pitch of one-eighth to the inch, and the radius of the thumb-screw being one inch, there is a gain of eight to one, and if the screw be applied with a force of only 20 lb., we have 8×20 lb. $= 160$ lb."

It may hereafter prove advantageous to use this powerful clamp in various other operations, in which the removal of parts may be desirable without the intervention of the knife, such, for instance, as a portion of the tongue, pendulous tumours, &c.; but, as yet, I have entirely confined its use to the treatment of hemorrhoids.—*Lancet, July* 3, 1880, *p.* 1.

41.—THE TREATMENT OF HEMORRHOIDS BY "CRUSHING."

By R. F. Benham, Esq., Ophthalmic Assistant, St. George's Hospital.

[Mr. Benham, the inventor of the clamp mentioned in the preceding article by Mr. Pollock, which is there described, makes the following remarks upon a case operated on by Mr. Rouse.]

A case was treated in private by Mr. Rouse, who informs me the patient underwent an operation for piles about ten years ago by one of our most eminent and skilful surgeons, and experienced so much pain and inconvenience for some considerable time that she expressed her extreme reluctance to submit to another operation. Mr. Rouse, however, operated on a large internal pile, allowing the clamp to grasp it for about four minutes, and on removing it there was not the slightest oozing. The patient complained merely of a feeling of soreness for a few hours afterwards, which was, no doubt, due to the dragging of the pile with the pronged fork.

It may thus be seen that if the clamp, after being firmly applied, be allowed to grasp the pile for about two minutes, all oozing may be avoided, and even if it should occur (which I feel confident would not be the case), the application of the torsion forceps would sufficiently control any bleeding. When the thin shred (or fringed remnant) which the clamp leaves, and which is extremely dense, and no thicker than a stout piece of paper, drops off, the surface of the part operated on is on the same plane as the surrounding parts (unlike cases where other clamps have been used). In all the cases mentioned by me, the patients have virtually recovered from the operation as soon as the effects of the ether have disappeared.

Now it is needless, and, perhaps, not within my province, to enter into details with regard to other methods of operating, as, although I have had some acquaintance with them during my course of study, doubtless the great majority of your readers have had more extensive experience on the subject than I have had; but I venture to assert that those who argue that the after-effects of the operation under Mr. Pollock's theory are the same as in other methods, are wrong, as the facts stated by me are incontrovertible; besides, the former is simpler and certainly more scientific, for by means of one crush the whole operation is at an end, whereas by ligature or with other clamps and actual cautery great care and very skilful treatment are absolutely necessary; for if in the former case the mucous membrane be not sufficiently snipped, the patient will experience acute and almost indescribable suffering, many instances of which have come under my notice. The bleeding very often

conceals the parts to be snipped before the ligature is applied. I have very frequently noticed that when in cases where the clamp and actual cautery have been used, the heated iron or benzoline cautery were not in working order—a dereliction of duty no doubt on the part of the assistant, but such is the case, occurring more often in private than in hospital practice. I confess, of course, that this is a mere matter of detail, but not to be overlooked.

While dwelling upon this subject, may I be permitted to suggest that in favourable cases, as a substitute for an anæsthetic, the part to be operated on might be frozen by means of the ether spray; for the interval between the application of the clamp and the closing of its jaws is momentary, and all sensation of pain avoided. I make these remarks by way of suggestion, as I have had no practical experience on this point. I may also suggest that it would, perhaps, be better to cut off the pile, while it is in the grasp of the clamp, with an ordinary scalpel instead of with scissors curved on the flat. This, again, is a mere matter of detail.—*Lancet*, *July* 24, 1880, *p.* 158.

42.—ON TYING HEMORRHOIDAL TUMOURS.

By Dr. Bodenhamer, New York, U.S.

Dr. Bodenhamer, in a paper contributed to the New York Medical Record for August 7, describes an improved method of tying hemorrhoidal tumours, which he says he has long practised with complete success. In some investigations which he had made upon hemorrhoids when in the quiescent state he ascertained that the most sensitive part of the tumour was at its base or its immediate point of attachment, showing that it should not be tied too close to its base, and that nothing should be included but the tumour itself. He also found that the lining membrane of the rectum is very much more sensitive than the tumour itself. The fine and delicate skin immediately without the orifice is the most sensitive; the muco-cutaneous coat immediately within is next in point of sensibility; and the mucous membrane of the rectum is the least sensitive of the three. This last, however, is much more sensitive than the mucous membrane covering the tumour.

According to the improved mode of operating, the tumour, as a general rule, is never seized by tenaculum or forceps and pulled down; for if this is done a portion of the mucous membrane, to which the tumour adheres, comes down with it, and is almost certain to be included. Hence, additional pain, protracted suffering, and more or less ulceration would necessarily follow; for the operator cannot distinguish the true base of

the tumour when drawn down in this manner, all the parts having generally the same appearance. I always require my patients to extrude the tumour simply by defecating efforts, or by the effects produced by an aperient or a relaxing enema. If these means fail to protrude the tumour, I employ a bivalve anal speculum, arranging it so that the tumour shall fall between its blades, when, with suitable instruments, it can be ligated within the canal just as easily as if it were external or extruded. I scarcely ever ligate more than one tumour at one time, and I use a fine soft silk ligature, well waxed, with scarcely any twist in it, somewhat like floss or dentists' silk. For, in proportion to the large size, the hardness and stiffness of the ligature, will be the increased pain which it will cause, and the length of time it will take the tumour to slough off. I am careful so to adjust the ligature as to exclude everything but the foreign body itself, and only make the ligature sufficiently tight to cut off the circulation—nothing more nor less. This fact can be known by the appearance of the tumour as it is tightened. I am also very careful not to place the ligature very close to the base of the tumour, as this produces more pain and is not any more effectual in removing the whole of it. The small portion of the base below the tumour will sooner or later slough off or disappear in some way. When the tumour is very large, or too large for one ligature, I divide it into two or more sections, according to its size, and multiply the ligatures, including but a small portion in each. This is done by arming a suitably curved needle with a double ligature, passing it through the tumour a little above its base, and, if necessary, re-passing it, and tying each ligature separately, thus including in the stitches every part of the tumour, and underlaying it, as it were, with a double uninterrupted suture. When any part of the tumour is covered with skin or muco-cutaneous tissue, I usually incise this upon the same circle that is to receive the ligature afterwards, by which more or less suffering is avoided. I sometimes, when the tumour is entirely external and covered with skin, and objection is made to the knife or curved scissors, ligate subcutaneously, which causes it to shrivel and gradually disappear. By this operation the integument, of course, is not interfered with, and much suffering and inconvenience are avoided. The subcutaneous ligation of external hemorrhoids consists in encircling the base of the tumour with a ligature passed immediately beneath the skin. This is accomplished by the use of a needle describing a considerable curve, penetrating the tumour at a suitable place, and carrying the ligature subcutaneously half round the same. The needle is then to be brought out at this point, and re-introduced at the point of exit, and carried round the other half to the original point of

entrance, and then tied. If the tumour is large it may be ligated in two or more sections. I sometimes employ *temporary ligation*—that is, suffering the ligature to remain upon the tumour for fifteen to thirty minutes only, and then removing it and replacing the tumour. This method, however, is only suitable in case the tumours are internal, and of a soft spongy texture, similar to those to which nitric acid is especially applicable. On examining the tumour a few days afterwards, it will be found to be smaller, and ecchymosis will be visible in all parts of it; and about the fifth or eighth day it will have entirely disappeared, with scarcely any pain or inconvenience during the whole process.

The *time to operate* is when the tumours are in a quiescent state. When the tumours are very irritable or inflamed, I wait if possible until the inflammation has subsided spontaneously or has been subdued. It often occurs that among several tumours which are in a quiescent state, there may be found one highly sensitive and irritable. This can be distinguished from the rest by its florid apppearance or by its being tense, tender, and painful on pressure. If the operation is performed when the tumours are irritable or inflamed, the pain and general suffering will be greatly augmented. To subdue this I sometimes apply a solution of nitrate of silver (ten to fifteen grains to the ounce) with a camel's hair pencil, applying almond or olive oil immediately after. Two or three applications in as many days are usually sufficient. It diminishes the sensibility and irritability in a remarkable manner. The patient should live on bland and unirritating diet, and his bowels should be relieved by enemata of the infusion of linseed, to which a little castor or olive oil should be added, or by the use of one or two teaspoonfuls of this powder taken in a little water: ℞. Sulph. loti, magnes. calc. saccholactin, equal parts. When the tumours are highly inflamed and swollen, as well as the contiguous parts, leeches should be applied at the anal region outside of the tumours, especially when the tumours become strangulated, and difficult, if not impossible to return. In such cases I have employed them with the most happy effect.

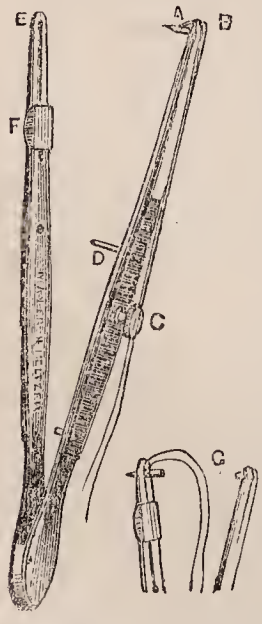
As true hemorrhoidal tumours vary in locality, structure, size, number, vascularity, sensibility, etc., so do they require modifications of treatment. Those in which, more than any others, ligation is more especially indicated, are the internal ones which are florid, soft, and highly vascular, which protrude readily and bleed freely; also those internal ones which are indurated, dark, and with little sensibility, protruding at each evacuation, and attended with a free mucous discharge. Those round and sometimes blue tumours, located at the margin of the anus, and

covered partly with mucous and partly with muco-cutaneous tissue, should, when large, be ligated after incising the part covered by the latter tissue. When any of these are very small, they may be let alone; but when any of these small ones are hard and painful, they should be punctured with a lancet, and their contents completely let out. Those tumours that are altogether external, or completely without the anus, and covered with skin, should be removed with the knife or curved scissors, or ligated subcutaneously.—*Medical Times and Gazette*, *Oct.* 2, 1880, *p.* 411.

43.—A NEW INSTRUMENT FOR THE INTRODUCTION OF STITCHES IN OPERATIONS FOR CLEFT PALATE, AND OTHER DEEPLY-SEATED LOCALITIES.

By Dr. Edward Woakes, Senior Surgeon to the Hospital for Diseases of the Throat and Chest.

Every surgeon who has frequent occasion to operate for cleft palate will agree that a simplification of the process for inserting the stitches, which is equally efficient with those commonly adopted, will, by shortening the period over which the anæsthesia has to be kept up, be a gain both to himself and his patient. The instrument, of which the following is a description, is introduced by the author to meet this want. It consists in the adoption of a shuttle in the form of a needle-point, containing an eye or slot to carry the silk or wire, A. This fits on to a slight projection or pin, standing out at right angles very near the end of one blade of a strong pair of spring forceps.



Between the needle and the extreme end of this blade the latter is indented by a slit to receive the silk after it leaves the shuttle or needle-point, B. When the silk is drawn home through this slit it is carried along the outside of the blade through a groove in a projection for the thumb, C, situated at a convenient distance for making pressure on the blade when using the instrument. By this means the needle is held firmly upon the inner aspect of the blade. The opposing arm of the forceps is somewhat broadened out to support the tissues when clamped between the blades. The centre of this is bored through exactly opposite the point of the needle when the blades are made to come together. This hole, E, has a projection or flange, which fits into a notch behind the point of the needle. It is made slightly smaller

than the needle, to receive which it opens somewhat by means of a spring, the blade being split for the purpose, the right degree of tension of the spring being provided by a slide, F, which is placed in position before use. The accurate juxtaposition of the needle-point with the split-ring when penetrating the tissues is secured by the guide, D, which effectually prevents any lateral swerving of the blades. When these are closed upon a flap, the fact of the needle being caught in the ring on the opposite side is indicated by a clicking noise. The thumb is now taken off the boss, C, which releases the silk, and allows the forceps to spring open. The needle is then firmly held in the other arm of the forceps, as shown at G. A little manipulation of this arm of the instrument suffices to draw the short shuttle or needle through the tissues now perforated, and with it the silk with which it is armed. This is drawn towards the operator, a good length of silk being provided for the purpose, and when well out of the mouth, the slide, F, is drawn back, allowing the spring to open at E, the needle is then slipped out with the silk still attached. It is next readjusted at B as at first, and the slide, F, replaced in its former position. The other side of the flap is now dealt with in a reverse manner—i.e., the needle is passed through from behind. The process is thus completed, the silk being passed through each side in a much shorter time than the above details would take to read. The suture thus passed is double, but it is easy to draw one thread out, should the operator elect to tie his knot with a single thread. Several needles are furnished with each instrument, and these being threaded beforehand, are readily adjusted to the instrument in succession, as stitch after stitch is inserted. The shuttle being left on the silk when this is used double, serves to identify each particular suture, and so facilitates the process of tying when all are inserted.

The shuttles now made for me have the eye a little further from the point than shown in the engraving. Other modifications in the instrument, suggested by experience of its use, may require to be made, but the principle of the shuttle, now introduced for the first time as a surgical appliance, will not be affected by such alterations.

The applicability of the instrument for gynecological operations, vesico-vaginal fistulæ, &c., will suggest itself. It is not improbable that its usefulness may extend to all cases where stitches have to be inserted in deeply-seated localities, in which manipulation with an ordinary needle adds to the difficulty of the operation. It is made by Messrs. Mayer and Meltzer, of Great Portland Street. The diagram is about one-fourth the size of the instrument.—*Lancet*, *July* 24, 1880, *p.* 129.

44.—ON THE TREATMENT OF STONE IN THE BLADDER, WITH SPECIAL REFERENCE TO RECENT PROGRESS.

By W. F. Teevan, Esq., B.A., F.R.C.S., Surgeon to the West London and St. Peter's Hospitals.

The symptoms of stone in the bladder are often very slight and entirely masked by the existence of some chronic irritation with an enlarged prostate, so that on several occasions I have detected calculi in patients who had been treated for cystitis for months and even years. If the act of micturition is associated with pain and blood, and if both be increased by exercise *there must be a stone.* On the other hand, a calculus may give no evidence of its presence beyond a slight smarting in the urethra. There is no difficulty in finding a large stone, but small calculi are often missed by badly-shaped sounds. The shorter the beak of a sound and the more it approximates to a right angle with the shaft, the more efficient will it be. I consider Mercier's sound, with Sir H. Thompson's cylindrical handle, to be the very best. When the instrument touches a small stone, the two bodies are in contact at points only, for they are both convex, hence the click is very faint, and there is always a tendency for the sound to push away the little calculus. For obviating this and more easily detecting small stones, Mercier devised a hollow sound with a flattened spoon-shaped beak, the concavity of which overlaps the convex surface of the calculus, and as the two opposing bodies have *surfaces* in contact instead of *points* only, a louder note is elicited. I prefer to examine a patient when his bladder is quite empty, for there is no trouble in finding a large stone, whether the viscus be full or not; but if the calculus be small and the vesical cavity full, the surgeon may make a prolonged examination and yet fail to strike the particular spot where the stone lies. When, however, the bladder is empty, a small calculus is brought to its very neck, and is struck by the sound as it enters. Text-books omit to point out that things *extravesical* as well as *intravesical* may be felt with a sound—the sacrum can always be touched, and very often the spine of each ischium. For a want of this knowledge the bladder has been cut into on several occasions, and, to the great mortification of the operator, no calculus found.

When a stone is found, what is to be done with it? In the present state of our knowledge and experience I regard the use of solvents as so much valuable time wasted. Unfortunately, a calculus is too often treated as such, whether it originated in the kidney or bladder, and stones of equal dimensions, whether renal or vesical, are dealt with in a similar manner. I look

upon the treatment of a stone which has formed in the bladder to be different from one which originated in the kidney and descended into the bladder, and the want of discrimination on this point has led to many disappointing results after operation. In one case the calculus is the *cause* of all the trouble; in the other it is merely a *result*. Take a man with a lithic-acid stone which is giving him much pain. What are the facts of the case? The calculus descended from the kidney, and until it entered the bladder that organ was healthy and quiet; the bladder, however, finds that it has a very unpleasant guest, and becomes irritated. Get rid of the intruder and the bladder will quickly resume the even tenour of its way. Not so, however, is the case with the phosphatic stone formed in it. Long before the calculus existed the bladder was in a state of chronic inflammation, the urine was muco-purulent, and the patient could probably only empty his bladder with a catheter. In such a case the stone formed as a matter of course, but it was entirely secondary to the vesical condition, and if removed leaves the patient but little better off, for the aches and pains will persist, the urine will not clear up, and a fresh concretion will rapidly form. If the calculus be of renal origin it ought always to be crushed in the adult, if not too large. In the present state of our knowledge and experience, enlarged and improved as it is by the introduction of Bigelow's operation, it may be said that any stone up to two inches in diameter may be crushed. Bigelow's operation has entirely revolutionised the treatment of stone in the bladder: it is a *new* operation. The principles upon which it is founded are as widely opposed to those upon which ordinary lithotrity was established as are the two poles to each other. The old method was sometimes spread over a period of months, the new one is the work of a certain number of minutes; and in this respect resembles lithotomy, the advocates of which operation used to urge that one of its great advantages was that, unlike lithotrity, it rid the patient at once of his trouble. Now this is exactly what Bigelow's operation does. The bladder frets for a few hours at the great liberties taken with it, but not finding any enemy to fight with it rapidly resumes its former wonted quiet. The rule hitherto has been to do as little as possible at the first sitting—feel your way, see how much interference the bladder will tolerate, and above all, do not let your lithotrite remain in longer than a couple of minutes; leave the fragments to nature to get rid of—unless indeed she cannot do so, in which case you must wash them out, a process "which is quite as irritating as a crushing with the lithotrite." Bigelow says exactly the opposite—do everything at once and for all, however long it may take you to do—leave nothing to nature to expel; remove it all. But it may be said

that surgeons performed lithotrity at one sitting and removed fragments before Bigelow's time. Most certainly they did, but they operated on the same principle whether they removed a calculus in one sitting or twenty; and all cases of lithotrity at one sitting were so performed because, as Curtis has pointed out, "a second sitting was an impossibility."

Then, again, the means the older lithotritists adopted to remove fragments or débris were looked upon as more objectionable than the evil they sought to obviate, of leaving the pieces of stone behind. In 1846 Heurteloup wrote a work on "Lithotripsie sans fragments au moyen de deux procédés de l'extraction immédiate, ou de la pulvérisation immédiate des pierres vésicales par les voies naturelles." He named his process "Lithocenosis" (stone evacuation). Of 124 cases of lithotrity, 69 were performed by him at one sitting.

In 1853 Amussat published a "Mémoire sur la Lithotritie en une seule Séance," and in our own time Sir W. Fergusson was a great advocate for removing fragments with the lithotrite. That these great surgeons did all this detracts nothing from the value of Bigelow's discovery. Cornay of Rochfort was the first to introduce aspiration into practice in 1843, and he originated the truncated catheter. Next came Sir Philip Crampton, then Mercier, then Clover, and lastly Bigelow. It is only just to say that Dr. E. M. Moore, an American, very nearly anticipated Bigelow in his discovery. Up to Bigelow's time aspiration was only partially successful, for two reasons—the small calibre of the evacuating catheter, which only permitted little particles to escape, and the weakness of the india-rubber bottle. Bigelow has made aspiration perfect, but he probably would not have succeeded had it not been for Otis, who demonstrated what large catheters could be introduced into the bladder. *But even if we had possessed Bigelow's perfect instruments, we should not have dared to perform his operation if he had not shown us the great amount of instrumental interference the bladder will tolerate if we only take care to remove all the fragments at once.* This is the grand point, and to Bigelow solely belongs the great merit of the discovery. I consider that his operation will prove an inestimable boon to mankind; it will save life by bringing within the fold of lithotrity a large number of cases which otherwise would have been submitted to the knife with a correspondingly increased risk; it will rob lithotrity of its peril to life in old men who formerly were often worn out by the cystitis set up by the frequent crushings, and it will take from lithotrity the opprobrium that it often removed the stone, but failed to cure the patient. All the aspirators now in use, Clover's excepted, are unconscious copies of Mercier's, whose aspirator consisted of an india-rubber bottle, fitted with a brass

tube and stopcock to fix on to the evacuating catheter, and a glass receiver for the fragments to fall into. The original one made by Charrière upwards of twenty years ago is now in the possession of Gouley, who has recently recorded a case in which he used it successfully. When Bigelow's aspirator arrived in this country it had no stopcock like Mercier's, which was, I think, a great mistake, for air entered the bladder, got churned up with the water, and caused much annoyance. At first I used to put a cork into the india-rubber tube after filling it to the very brim, but in spite of this I found that air would always enter the evacuating catheter during the process of adjusting the two tubes. I accordingly restored Mercier's stopcock, and have experienced no further annoyance. The great improvement in Bigelow's aspirator above all others consists in placing a long piece of india-rubber tubing between the bottle and the evacuating tube. Everywhere we see art imitating nature in placing pads, springs, or buffers between bodies which would otherwise be brought into rude contact, and to fix an aspirator directly on to a rigid tube without an intervening medium to damp the concussion is contrary to all the laws of mechanics, for the shock which takes place each time the bottle is squeezed is transmitted unimpaired to the metal catheter. Then, again, the india-rubber tube acts as a syphon when the aspirator is at work, so that there are two forces in operation. An objection has been made to it that its length diminishes the power of the aspirator; it is, however, purely theoretical, for evacuation, as performed by Bigelow's aspirator, is simply perfect. The glass-receiver, which in Mercier's is fixed, takes off and on in Bigelow's, which is another improvement, and as it is made longer and narrower the fragments cannot escape when once they have dropped in. To English surgeons Bigelow's lithotrite seems somewhat cumbersome, except for breaking up large stones. Until six years ago Civiale's lithotrite was almost universally employed here. Sir H. Thompson improved it by adding to it his cylindrical handle and particular mechanism for fixing the blades. The three special points in Civiale's instrument were—(1) the jaws were placed at a very oblique angle to the shaft; (2) the male blade had no spur; (3) the female blade had only a small pinhole for the ejection of débris. Mercier condemned Civiale's lithotrite, and said it was "l'un de plus mauvais," and his verdict has been fully justified by the accidents which have occurred to lithotrites made on Civiale's principles. These were due to the vicious lines on which they were built. As the jaws were placed so obliquely to the shaft there was much loss of crushing power, for the body of the male blade could not be brought well home to the stone which it crushed with its tip,

and as it had no spur it sometimes broke at its weakest part—the angle. Then, again, the female blade had only a pinhole for the escape of débris, so that the instrument was liable to become "packed" and incarcerated in the bladder. Six years ago, in the Lancet, I introduced Mercier's lithotrite to the notice of the profession, with a special mechanism of my own for fixing the blades. The three great points on which it is constructed are—(1) the male blade is fixed as nearly as possible at a right angle to its shaft, thus obtaining great crushing power; (2) the male blade is strengthened at its angle by a spur or prow, which also drives out the débris and prevents "packing"; (3) there is a large opening in the female blade for the escape of débris and the reception of the spur. All these principles have been adopted by Sir H. Thompson in the construction of what he calls his "new lithotrite." The old operation of lithotrity will now only be required for small calculi, which can be pulverised in a few minutes, and for which aspiration would be unnecessary. Lithotomy will only be demanded for very large, hard stones; big, soft calculi can be most safely disposed of by lithotrity and external urethrotomy at one sitting.

What are the conditions which bar lithotrity, enlarged as it now is, in its scope by Bigelow's operation? *Boys* will continue as heretofore to be submitted to lithotomy, for their parts are much too undeveloped to allow of the application of Bigelow's procedure, even if it were desirable; but *women* are admirably adapted for his operation, for in them the urethra is short, straight, and capacious. In *men* the only condition to preclude crushing is that contracted condition of the bladder which occasionally exists and interferes with the manipulation of the lithotrite. A strictured urethra can be restored to its normal calibre, and an enlarged prostate can usually be surmounted. No kind or amount of renal disease forbids Bigelow's operation if the patient be physically fit for it. In those cases where the diseased bladder is the cause, and not the result of the stone, I am afraid that his method will no more prove a success than did ordinary lithotrity. In the four instances of lithic-acid calculi in which I performed Bigelow's operation the results were admirable, but in the case of a phosphatic stone of local formation, entirely secondary to a diseased bladder, requiring the use of a catheter, it removed the calculus, but failed to cure the patient. In a recent clinical lecture at the Bellevue Hospital, Gouley has pointed out that surgeons will be mistaken if they suppose anæsthesia and aspiration have rendered lithotrity easier to perform, and that it will, on the contrary, now more than ever demand the utmost care and delicate skill. Very recently Keyes of New York has collected

the results of 107 cases of Bigelow's operation performed by English and American surgeons with but six deaths. Nothing could be more satisfactory, and the success achieved far surpasses the results obtained by any other method.

Lithotomy will now only be required in adults for very large hard calculi. For stones up to three ounces in weight lateral lithotomy is an admirable operation, and although much larger calculi have been removed by it, the rectum was usually cut or torn. I consider that the introduction of Bigelow's operation will bring to the front those other forms of lithotomy which have rarely been practised of recent years. I have a personal experience of everyone of them save the suprapubic. The bilateral is specially adapted for those stones which are rather too large for the lateral method, for it gives as much room as two laterals. The recto-vesical is well-devised for enormous calculi or debilitated subjects, for it can be performed with the minimum amount of cutting and loss of blood, and it affords the greatest amount of space. The extraction of a calculus by it closely resembles the removal of a child with the forceps, for in each instance the presenting body passes through the centre, where there is the most room. Two objections are urged against this operation. It is said the peritoneum may be wounded and that a urethro-rectal fistula may remain. The former may be avoided by making lateral incisions through the prostate instead of a vertical one, and a fistula is not necessarily incurable. According to Dulles' statistics the results of the suprapubic operation for stones above two ounces in weight were far more favourable than those of lateral lithotomy. The operation is specially indicated for large calculi in men who, on account of their enlarged prostates, are obliged to use the catheter, for a small aperture might be kept permanently open for the instrument. Median lithotomy will only be required for large hard calculi which have been "fragmented." In extracting a calculus in lithotomy the surgeon has the choice of removing it by cutting or laceration, for there is no such thing as dilatation of the prostate, as was long ago proved by Professor Ellis. Many years ago I carried out a series of investigations on this point and submitted the results to the Pathological Society, which proved that the normal calibre of the prostatic urethra was much larger than had been supposed, but that it could no more be exceeded than the calibre of any other portion of the canal. I further ascertained from my experiments and from an examination of all specimens of parts after lithotomy in the London museums, that a stone not more than 60 mm. in circumference could be extracted through a non-incised prostatic urethra without laceration. The extreme normal calibre of the prostatic urethra may be regarded as from 50 mm. to 60 mm.,

and in old men it is often greater. This is an important anatomical fact, for it enables us to take advantage of it and utilise it for breaking up large soft stones and extracting the fragments by external urethrotomy, and so avoiding the severer operation of lithotomy. The examination made on twelve fatal cases of lithotomy occurring in the practice of one of the most distinguished British surgeons deceased, who professed to extract calculi by a limited incision and dilatation, showed that in every instance the prostate had been ruptured. To prove that the division of the prostate and its capsule is not followed by a fatal result, I need only refer to the twenty-two boys whom I have cut by the lateral method, everyone of whom recovered, notwithstanding the fact that the breadth of my knife exceeded the diameter of the lateral half of the prostate in each instance. The most successful lithotomists were probably Brett, Martineau, and Gutteridge, and the peculiarity in their method was that they used no force when extracting calculi, preferring to enlarge the incision if necessary rather than tear out the stone through an insufficient opening. The fewer the instruments used in lithotomy the better. For boys I employ, as a rule, only a staff and a knife, extracting the calculus with my finger. If, on account of the enlargement of the prostate, the depth of the perineum, or the shortness of his finger, the surgeon is unable to reach the bladder, he uses a gorget. Now, if the probe point on the gorget be transferred to one of the blades of the forceps, the surgeon can slide the instrument along the groof of the staff into the bladder with unerring certainty. This slight modification of mine renders the gorget unnecessary, and so one less instrument is required. I have given up using the sharp-pointed knife for making the internal incision in men since Mr. Gutteridge convinced me of the risk attending its employment, for if it should slip from the staff, the posterior wall of the bladder will most likely be pierced, and the patient killed by peritonitis. Had the deaths which have occurred after operations through the above accident been published, the sharp-pointed knife would long ago have received its *congé*. In boys it is a choice of evils, for if the surgeon change his knife, he may not be able to introduce the probe-pointed one, and if he fail, he may push the yielding tissues before him, and rupture the urethra. I consequently still use a sharp-pointed knife for them, with a short broad blade, and, by holding it short, lessen the chance of doing mischief if it should slip. I prefer Mr. Jonathan Hutchinson's rectangular catheter staff to any other. It has two great advantages. The surgeon can determine if the instrument is in the bladder or not, whether he strike the stone or not, for a short-beaked sound may touch a stone when a staff cannot. Then, again, it gives a straight

road into the bladder instead of a crooked one, and so the chances of the knife slipping are reduced to *nil.* No tube or plug of any kind ought, I think, if possible, to be retained in the bladder after the operation, for however large a tube may be, it will not allow clots to escape, and if they cannot, they give rise to straining and cause bleeding or prevent its arrest. By leaving the wound open the surgeon sees what hemorrhage may take place, for cases have occurred of fatal bleeding into the bladder when the wound was plugged. Then, again, the retention of clots which are rapidly decomposed by the urine in a few hours is a likely source of blood-poisoning. If hemorrhage should occur, the best way to arrest it is to apply an ice-bag above the pubes, and insert pieces of ice in the wound and rectum.

In the treatment of stone in the bladder when it occurs as a local formation secondary to the diseased bladder, of which it was not the *cause*, but the *result*, the following pathological facts must be borne in mind:—Firstly, the condition of the bladder is such that, even if the calculus be completely removed by crushing and aspiration, some local irritation will remain, the alkalinity of the urine will persist, and a speedy recurrence of stone take place; secondly, the condition of the prostate in these cases not only does not improve, but gradually becomes more troublesome as age advances, and auto-catheterism is rendered increasingly difficult. The following indications have to be carried out:—1. Remove the stone. 2. Cure the cystitis. 3. Give the patient a short and ready route to his bladder for the catheter. A case such as the above is in this country too often relegated to lateral lithotomy, which is unnecessary and uncalled-for, for directly the surgeon has grasped the stone with his forceps it crumbles to pieces, and the operation, instead of being a speedy one, becomes a prolonged one, for he has to extract some twenty or thirty pieces, during all which time the man's engorged prostatic plexus of veins pours out blood like water. In devising an operation for such a case, we must take cognisance of the following facts. The stone is soft, and can on the slightest pressure be reduced to fragments small enough to pass along the normal urethra. An incision into the bladder is therefore unnecessary; but we want to cure the cystitis which caused the calculus, and this can only be done by allowing the urine to run out as fast as it enters the bladder, and so give it a physiological rest. We require further a short route for the catheter to go into the bladder. External urethrotomy fulfils all these conditions. All we have to do is to reduce the stone to fragments with the lithotrite, extract them through the perineal puncture, and wash out the bladder, leaving in a tube for drainage: the small puncture being kept permanently

open for catheterism. It will at once be seen that whereas lateral lithotomy was a dangerous operation, and the wound could not be utilised for future catheterism, this combination of mine is attended by but little risk, comparatively speaking, and the aperture can be made useful for catheterism. What is it that makes lithotomy a perilous operation whilst external urethrotomy is not? It is because the former is an *intra-pelvic* operation, whilst the latter is an *extra-pelvic* one. Thus, therefore, by reducing the lateral lithotomy to a mere external urethrotomy, we shall diminish the rate of mortality correspondingly. I believe I was the first to introduce this combination, and in the unpromising cases in which I performed it, it was followed by the best results. But it may be asked, Is not this the perineal lithotrity of Dolbeau? It is not. There are two objections to this operation. In the process of dilating the urethra with instruments the urine always escapes, and the canal is very likely to be injured. The stone has consequently to be broken up in an empty bladder, which is a difficult and dangerous procedure if it be large, and during the long and tedious process the patient is bleeding, and no means can be taken for its arrest. Dolbeau cut first and then crushed the calculus through the perineal wound. I, on the contrary, crush first through the penis, and then cut. The operation of breaking up a large stone during lithotomy into several small ones is of ancient date, and is called "fragmentation" by the Americans, to distinguish it from lithotrity, which it is not. I consider therefore that the combination of a perfect lithotrity at one sitting, followed immediately by external urethrotomy, is the proper treatment for large phosphatic calculi in men who are the subjects of chronic cystitis, and who are obliged to use the catheter; for we remove the stone at a minimum risk, we give the bladder the physiological rest it requires, and we convert penile catheterism, which in these cases is often a painful, bloody, and difficult process, into perineal instrumentation, which is free from all these annoyances. Last August I published the results of my first series of one hundred consecutive cases of operation for stone in the bladder.—*Lancet*, *July* 31, 1880, *p.* 162.

45.—REMARKS ON PROGRESS IN THE TREATMENT OF STRICTURE OF THE URETHRA.

By Sir H. Thompson, Surgeon Extraordinary to the King of the Belgians; Consulting Surgeon to, and Emeritus Professor of Clinical Surgery at, University College Hospital.

It may be in the recollection of some of us, perhaps, that during some years ago, a long and severe controversy was held

on the management of stricture between authorities in London and the late Professor Syme of Edinburgh, in which others also participated both in this country and in France.

The subjects then chiefly at issue were: 1. The value of caustic applications, which had long been used, and were at that time still much employed in the treatment of strictures which had proved rebellious to dilatation; and 2. The safety and efficiency of an operation for dividing the narrowed parts of the urethra by an adequate median incision carried through all the structures of the perineum, and involving the whole of the narrowed urethra. This operation was then warmly advocated by Professor Syme for obstinate and chronic examples of the disease, although the stricture might be permeable to instruments—indeed, that it should be so, was a condition necessarily essential to Syme's operation. Perineal section had long been an established operation for impermeable stricture, but it was a novelty to perform it when an instrument could be passed through the stricture into the bladder; and a cutting operation was then declared by many surgeons to be unnecessary, if not unjustifiable, in such circumstances. Both modes of treatment have now almost disappeared. Are we to infer that progress in the art of treating stricture has, therefore, been made,—that some better substitute for the methods alluded to have been adopted in their place? The answer to this question I propose to consider.

On carefully reviewing the course which surgical inquiry and practice have taken during the period named, and without troubling you in this brief record with names and details which, necessarily familiar to myself, would unduly extend its limits, I think it may be answered that progress has been made. The march of events in this, as in other matters, is not always in a right line, but rather in that of an advancing pendulum. With occasional devious movements, right and left of the *via media*, an undoubted advance is ultimately achieved.

The most important changes in relation to the treatment of stricture of the urethra, during the last thirty years, in this country may, I think, be classified under five heads.

1. A general recognition of the principle, that a delicate and gentle manipulation of any instruments in the urethra, is alone trustworthy or permissible, in the place of that which was formerly greatly prevalent—viz., that urethral obstruction might often be overcome mainly by force.

2. The substitution of very pliable and taper instruments for silver and stiff gum-elastic instruments in much of the treatment, both in ordinary and in continuous dilatation.

3. A more general acceptance of the doctrine, that—given time, patience, and gentle handling—very few strictures should

be met with which cannot be fairly and successfully traversed by an instrument passed through them into the bladder. At the same time, an undoubted improvement is to be noted in the mode of operating for those exceptional cases in which the surgeon fails to accomplish that object.

4. A more general acceptance of the doctrine, that dilatation of the urethra, whether with or without incision, may be carried with advantage to a somewhat higher degree than had for some time previously been regarded as desirable.

5. The substitution of internal urethrotomy in some form for the application of caustics, and for external urethrotomy on a guide.

All these may, I think, be accepted, and will be generally accepted, as illustrations of advance in the treatment of stricture.

I propose to make a remark or two on each of the topics named, at the same time venturing to indicate anything which may appear to me to be a sign of retrograde movement at any point.

I need say little on the first subject: viz., the substitution of gentleness and more careful modes of manipulation for those which were previously in vogue. Men of the present generation, however, scarcely know how rude, and, in some hands, almost barbarous, was the method of handling formerly employed in the treatment of urethral disease. The term "forcing a stricture" was then, as it had long been, an accepted surgical term both here and abroad, and denoted simply the systematic application of violence to an organic obstruction—the result of which, in nine cases out of ten, was, and could only be, the laceration of the canal and the making of a false passage. I suppose I am right in saying that such a proceeding is no longer a surgical one; and, if ever adopted, is intended to be an exceptional occurrence, and not within the limits of the rules of our art. If there was one thing more than another in the treatment of stricture which, at an early date, appeared to me unwarrantable, not to say shocking, it was the sight of a surgeon, firmly grasping a solid instrument and pressing its point with rigid arm against an urethral obstruction until something gave way, and the point was made to advance—somewhere. From the earliest time to the present, I have invariably taught, not merely that a narrow stricture can only be traversed by gentle means, but that nothing prevents success so much as a deviation from this rule; and I believe that the constant advocacy of it has not been without its influence in suppressing the dangerous practice which formerly was but too common.

The substitution of modern flexible instruments, chiefly of

French origin, for the silver catheters almost invariably used thirty years ago, when the old wax or plaister bougies had fallen, somewhat undeservedly perhaps, into disrepute, has been an advance of enormous importance. I first learned the value of flexible instruments many years ago in Paris, and have used them ever since, and still desire to speak in high terms of their practical utility in most of the varied forms and kinds in which they are presented. To a certain, although limited, extent, some of them have aided us to achieve that very considerable advance in the treatment of stricture which was set on foot by the late Professor Syme, and consisted in the doctrine (first distinctly taught and illustrated by him), that impermeable stricture is a condition of extreme rarity. In other words, he proved that almost any stricture, however narrow, if urine passes outwardly through it, is permeable also to instruments in the hands of a careful, patient, and practised surgeon—provided only there is no crisis of actual retention present demanding immediate relief. The gain accruing to the patient through this doctrine has been very great: since, thirty years ago, a dissection through the perineum for so-called "impermeable stricture" was a comparatively common operation in our hospitals; and one, moreover, which was frequently fatal. Very rarely, indeed, ought such a proceeding to be heard of now, since, with time and patience, a fine instrument can almost invariably be carried safely through any stricture into the bladder.

But these instruments are invaluable also in prosecuting the ordinary treatment known as "dilatation." Notwithstanding the small value set upon this method by some surgeons, who profess to regard it as scarcely worth the name of treatment, and desire to substitute urethrotomy in almost all cases of stricture, whether recent or confirmed, I see no reason whatever for discarding it. If the cutting operation necessarily conferred a cure, in the sense of preventing return of the disease, even in a bare majority of cases, the propriety of employing dilatation might perhaps be called in question. This point will be considered hereafter; meantime, there can be no doubt that such complete relief is afforded, and on terms which are easy, by the use of simple flexible bougies, or by the same supplied with lead cores, and, lastly, by well-polished tapering metal sounds, that I believe it to be in the patient's interest to employ dilatation only so long as it is quite efficient; and then, as soon as it ceases to be so, and mostly not until then, to adopt other methods of a more serious kind.

To revert for a moment to the occasional existence of an "impermeable stricture," which has just been referred to, it may be briefly said that when, as sometimes happens, the

surgeon fails, after adequate trials, to pass any instrument, however small, through a narrow or tortuous stricture, the method known as "perineal section" sometimes proves a valuable resource. Like other proceedings, it has been rendered more easy and efficient, and is a far safer operation than that which was done fifty years ago. Since that time, various little improvements have been added to the details of the performance, so as to facilitate the finding of the narrowed passage.

The "calibre" or "diameter" of the urethra, or the amount of its dilatability, is a subject which has come again to the front during the last few years: this time, from attention paid to the subject in America. This is one of those points relative to which our figure of the pendulum is in some measure applicable. It has always been a subject affording matter for discussion throughout the history of urethral surgery, relative to which, had we time, I could give you some curious illustrations. The different measurements made by anatomists at different epochs—and their name is legion—are remarkable chiefly for their diversity; and the rules of practice pursued by different surgeons have similarly varied. This is a fact which need not excite surprise, considering the complex nature of the passage, the relations of which have been so largely studied. The question is one of sufficient importance to be worth considering, perhaps, more closely. A good deal of the apparent discrepancy in the measurements, in the use of terms, and consequently in the practice of different surgeons, is due, in my opinion, to a certain failure among many to recognise what are the natural physical conditions of the passage in question. We hear of its size, of its diameter, of its calibre, as if the urethra were a tube of constant capacity—as if it resembled an artery, a bronchial tube, or an intestine. But, in fact, the urethra has no constant quality comparable with that which we call "size" in any sense in which that term applies to the passages just mentioned. Indeed, the urethra has no "size" or "calibre" when it is not used as a canal; and it is only thus used during a few minutes, one might rather say seconds, during the twenty-four hours, and also when artificially opened by the passing of a foreign body into it. It is simply a long chink, the sides of which are maintained in close contact by organic muscles, and traversing a mass of complex structures, which, like itself, are susceptible of great physical changes under different circumstances. Second to its natural contractility, the most distinguishing mechanical quality of this closely shut passage is its dilatability—a still undetermined, and, I may add, an undeterminable, quality; for its dilatability naturally varies greatly in different parts of its course, in con-

sequence of the variety in the nature of the surrounding structures; while its own delicate walls and subjacent tissues are almost indefinitely extensible under the influence of continued pressure.

During the first third of the present century, there was a strong tendency, both here and in France, to regard the urethra as a passage of greater size than the surgeons of the preceding epoch had assigned to it, and to use larger instruments in the dilatation of stricture. Boyer advocated them, and, later, Mayor of Lausanne employed them, sometimes with much force. In this country, Pearson, who had a large experience, made a point of carrying dilatation as a cure for strictures to Nos. 18 and 20, English scale, equivalent to about 28 to 32 of the French scale. One of his instruments has long been in my possession, and is here for your inspection. A good deal of mischief followed what may have been the indiscriminate use of these large bougies; hence a reaction took place, and smaller sizes were adopted, with less beneficial influence, perhaps, upon the stricture itself, but also with less evil on the constitution of the patient. Within the last few years, Dr. Otis of New York has revived the theory of "the large diameter of the urethra," and has advocated larger instruments; besides recognising as examples of organic stricture very slight deviations from what he conceives to be the normal "calibre," or what I should regard as the possible extent of dilatability possessed by the passage. I have no intention of formally examining the views which he has enunciated relative to this matter, having no allotted time or space in this paper for the purpose. But I will venture to say, in connection with this subject, that we, on this side, may perhaps have erred somewhat during the period of reaction referred to, in not sufficiently availing ourselves, especially in the practice of lithotrity, of the large degree of dilatability which the urethra undoubtedly possesses; and that we owe to our American brethren an advantage which the latest assertion of that fact has pointed out to us. And I desire hereby to record my sense of the value of that lesson by assuring them how gratefully I receive and profit by it. But I cannot say thus much without also saying, in the same breath, that it is a very easy thing to damage irreparably some individuals by overdistending the urethra, and that such damage I have of late witnessed in several instances. I must oppose also, another doctrine which is associated with the preceding, viz., that stricture of the urethra is permanently cured by complete division of all the diseased tissues affecting the passage. I have seen too many examples of return of narrowing in cases thus operated on, to admit that at present we possess any certainty of being able so to act on a confirmed organic stricture,

as to ensure its non-appearance in after-life. Further, I have carefully followed many of Syme's cases of external division in his and in my own hands, where the diseased structures constituting stricture have been entirely divided, and in a way more certainly complete than any internal urethrotomy can offer; and am compelled to avow that, in very few instances indeed, has the thus divided stricture not reasserted itself after the lapse of time. Nevertheless, it is an important truth that, when any portion of the stricture escapes division, the narrowing speedily returns.

For that operation, I have myself substituted internal urethrotomy in the treatment of obstinate cases, during a period of now considerably more than twenty years, having ceased to perform Syme's operation, as a rule, in 1857. Since that date, I have performed the internal operation at University College Hospital and elsewhere some hundreds of times. My experience leads me to regard it as a far safer proceeding than Syme's in relation to life, and one which is quite as efficient in relation to the general results.

But, at the date named (1857), internal urethrotomy was rarely, if ever, employed in this country; the method best known here, viz., that advocated by Stafford, had lapsed through its inadequacy to render any important service, and dilatation and caustics constituted the treatment for the great majority of cases. Like many of my brethren, therefore, I tested other proposals which appeared soon afterwards, such as by splitting the stricture, which attained a considerable popularity for a time; over-distension, etc. Like others, too, I believe that there are good grounds for the conclusion that, for those examples of the disease which are so confirmed as to defy dilatation, those methods are inferior in permanency of effect to a well performed, that is, to a complete, division by internal urethrotomy.

Nevertheless, regarding the many methods of performing internal urethrotomy which have been proposed and practised, I doubt whether it is possible for anyone to pronounce which is absolutely the best. In every one, the object is, or ought to be, the same, viz., the complete division of the morbid tissue; but varied mechanical means of accomplishing this are originated by different minds, and different modes suit the hands of different surgeons. Each one probably prefers to accomplish the object with the instrument with which he is most familiar, and that method will generally be the most efficient in his hands. At the same time, many of the modes employed to accomplish internal urethrotomy will not ensure the complete division of the strictured portions of the urethra, and such methods must be regarded as defective.

The principles which govern a sound procedure are more essential points for the surgeon to discover and to teach, than a consideration of small details. These principles may be briefly stated, I think, as follows.

1. The necessity for a physical examination before operating, to detect and estimate the narrowed portions of the urethra. This is best accomplished, in my opinion, by means of a series of metal bulbs on slender stems, taking care not to regard as diseased changes those points at which the urethra itself is naturally only slightly dilatable. These bulbous exploring sounds I have invariably used, advocating them as essential to diagnosis in my first work, twenty-six years ago; and I still prefer them to any other, as safer, less irritating, and not less efficient, than more complex instruments which have been devised.

2. The necessity for accomplishing a complete division of all the morbid tissue constituting the stricture, by an incision carried through it; no matter what part of the urethra, or how much of it, is involved in the disease. As a general rule, this is, I think, most efficiently completed by a slender blade, carried beyond the stricture, and made to cut from within outwards; this latter proviso being, however, an open question. The important point, however, is, that any alleviation of the patient's condition attained by operation will be transitory if any part of the narrowing be left undivided.

3. I regard it as essential, after such division, to place at once a full-sized catheter for some hours in the bladder, to ensure a free outlet for the urine, and prevent all possibility of extravasation of urine into and through the incisions thus made.

4. The necessity for passing full-sized bougies subsequently, at occasional intervals, in order to effect free distension of the walls of the urethra, which lie in almost constant apposition, and so to prevent the reunion of divided surfaces by the first intention.

The foregoing may, I believe, be held to embody those general principles which most experienced surgeons at the present day agree—with a few dissentients, I am aware—ought to guide us in practice. That there are different modes of carrying them out is, as I have before intimated, a matter no less of notoriety than of necessity, as inherent in the nature of things. Such a circumstance may be regarded as one fraught with some advantage for us here, in providing scope for discussion, and so eliciting a comparison of ideas and methods among the many experienced observers who honour the Section with their presence this day. I shall, therefore, very briefly offer my own views as to the best mode which a long familiarity with the operation in practice has led me to adopt.

In respect of the instrument to be employed, I unhesitatingly avow a preference for one which, in principle of construction, resembles a slender knife with a long handle, in order that it may act completely in obedience to the impetus given to it by the hand. Concealed within a bulb at the end of the instrument is the blade; so that, before this is unsheathed, the urethrotome itself is an efficient bulbous-ended explorer (like those already employed in the previous exploration), and is used as such to identify the stricture again at the very moment of operating. With such an instrument, the incision is directed solely by intelligence, and is limited or extended according to the sensations experienced by the operator's hand, of resistance or the reverse; just as happens in the analogous instance of division of tissues which are not visible, in the case of contracted tendon in club-foot.

To my mind, having had some little experience of the last-named proceeding many years ago, when surgeon to the Marylebone Infirmary, the two operations much resemble each other, and alike require a skilled and unrestricted hand to accomplish a satisfactory division of the constricting tissues; the right amount, neither too little nor too much.

All urethrotomes in which the blade can only move in a grooved director, and this is undoubtedly the most common mode of constructing them, produce a more or less uniform mechanical result, and are incapable of effecting any variation in depth and extent of incision, often necessary to accomplish adequate division in the varying conditions requiring operation. This is what I am compelled to regard as a serious defect, and explains my preference for the bulbous-ended instrument described. It is right to say, however, that the following objection to the latter is sometimes raised, viz., that very few strictures requiring operation are sufficiently narrow to permit the introduction through them of an urethrotome, the bulb of which is equal to No. 5 or 6 of the English scale. That may be quite true; but I have never seen a case of stricture, however obstinate or narrow, which could not be temporarily brought to the size required by tying in a slender gum-elastic catheter; and I think the advantage of operating in the manner described well worth the delay of a day or two devoted to such preparation of the urethra. Still, I am quite ready to concede that an instrument which cuts by means of a blade advancing from without inwards, on a guide previously passed, may be a safer one in some hands, especially if they be not thoroughly practised in traversing the urethra. My experience of internal urethrotomy, which has thus been conducted throughout, that is, on the same principle and with the same instruments, has been from the first exceedingly satisfactory. The operation itself is fraught

with very little risk; the durability of the relief afforded is the chief question to ascertain. The last twenty years have enabled me to watch the history and course of a good many cases; and, speaking in general terms, I may say that the first three or four years after the proceeding, often more, are very comfortable for patient; after which, at earlier or later dates, say from four to seven years afterwards, he often finds himself reluctantly compelled to retreat a number or two in the size of the bougie, which he has been accustomed to pass once or twice a month. Instead of 11 to 13, English scale, he must be content with 9 or 10, or less; but he has no symptoms to complain of. At an interval, varying in different cases from seven to twelve years, the condition in some cases becomes troublesome, and the patient finds No. 7, 6, or 5 perhaps, frequently necessary, and also that some of the old symptoms have returned. In such circumstances, I do not hesitate to advise another operation, and have occasionally performed it a second time. It so happens that I did this for one of my medical brethren only last week, having previously employed the same proceeding in 1867, thirteen years ago. I passed a No. 17 English, about 28 French, with ease, immediately after the incisions, and he is now doing admirably. In one case only, I have done the operation three times for the same patient. There is no reason why it should not be repeated, if necessary, just as we crush a second or a third calculus which may be formed after the first. In the case last referred to, the best result followed the third operation, and occasional dilatation has been quite sufficient to maintain a highly satisfactory state of the urethra ever since, although the date of that operation is at least eight years ago. I am very certain that the plan I have followed is one of great value for cases in which dilatation does not afford adequate relief; and I certainly think we are more prone to err in withholding the operation than by recommending it too generally. Inadequate relief to the stricture involves irretrievable mischief to the ureters and kidneys; and many a life has been sacrificed to persistence in painful and inefficient attempts to dilate, which might have been saved by free division of the stricture or strictures. The formation of a free passage for the urine is the necessary safeguard for the secreting organs and there should be no loss of time in accomplishing it by internal urethrotomy, so soon as the stricture is no longer readily amenable to the action of dilatation. But when the operation is adopted, nothing less than a free and complete division of all the obstructing tissues should satisfy the operator. It cannot be too often repeated that on this depends the success of the operation. —*British Medical Journal, Aug.* 28, 1880, *p.* 325.

46.—OPERATIONS FOR RETENTION OF URINE DEPENDENT ON STRICTURE OF THE URETHRA.

By John Simon, Esq., C.B., Consulting Surgeon, &c., to St. Thomas's Hospital.

At the close of the first fifty years of the present century, the general rule of surgical practice, with regard to unyielding cases of strictural retention of urine, was, that the surgeon in last resort must proceed to the so-called *Perinæal Section* which had then come into vogue, and which claimed as its distinctive feature and merit that it included *Division of the Stricture.*

I am not aware that before 1852 any dissent from that rule of practice had been publicly expressed; but early in 1852 protests against it were raised simultaneously, though independently of each other, by my much esteemed friend, Mr. Edward Cock, and myself; by him, from Guy's Hospital, in an admirable paper read before the Royal Medical and Chirurgical Society on April 13th; and by me, from St. Thomas's, in the present lecture, which was published in the Medical Times and Gazette of April 10th and 17th.

As against the then popular perineal section, Mr. Cock and I were quite at one,—equally contending that, in cases of the described sort, the surgeon had better limit his immediate aim to providing a proper artificial outlet for the urine, not making any attempt at division of the stricture, but leaving the stricture, at least for a time, unmolested by surgical instruments as well as without pressure from the bladder. Thus far Mr. Cock and I were agreed; but beyond this point, we differed. In answer, namely, to the question, in what way would we provide for the urine the artificial escape which we recommended, Mr. Cock's advice was *to tap the bladder through the rectum*, while mine was *to open the urethra in front of the prostate;* and each of us devoted most of his paper to advocating and illustrating the particular operation which he preferred.

Mr. Cock expressed in his paper a most unfavourable opinion of the alternative which I was recommending, and which at an earlier date he had himself in some instances tried; but I have the pleasure of knowing that he afterwards became convinced of its advantages; and they indeed could not be better stated than they at last are by himself in a paper which he contributed in 1866 to the Guy's Hospital Reports. So effectual has been Mr. Cock's conversion, that the alternative which he in 1852 denounced has now at Guy's Hospital got to be familiarly called by his name; and I even observe that two of the present surgeons of the hospital—Mr. Bryant in his Manual for the Practice of Surgery, and Mr. Howse in the last volume of the Transactions of the Clinical Society, formally write of it as "Cock's operation."

I need hardly say that no living surgeon can pretend to have invented the operation of cutting from the perineum into the membranous portion of the urethra. Speaking of it as mere anatomical operation, we could perhaps not easily name the time when it was unknown. As a way to relieve the bladder, it must at any rate I should suppose have been often tried in this country before the present century; while on the Continent it seems to have been known to surgeons as one of the forms of "la boutonnière." It will be seen that towards the close of my lecture I mentioned some notices of the operation by contemporary British surgeons; and had I at the time been aware of it, I might with advantage have adduced a fuller and more applicable quotation from the pages of Sir Charles Bell's last surgical work, his Institutes of Surgery, published in 1838. Discussing in that work (vol. i, p. 305) the question "how the bladder is to be relieved in case of total obstruction," he says that of late years he has rejected all other methods than the following:—"Put a catheter or a sound down to the stricture and give it to an assistant; introduce your finger into the rectum, and feel the prostate. Thus prepared take a sharp-pointed bistoury, slightly curved, plunge it into the perineum just anterior to the anus, carry it towards the face of the prostate. The finger in the gut, the knife is carried in the outside of the gut. When the point has arrived at the prostate, the hand is to be depressed, and the point thrust into the urethra. It is to brought out, cutting along the membranous part of the urethra, and at the same time in a manner to open the integuments of the perineum largely. The urine spouts from the incision, and the patient feels instant relief. The patient from this movement being safe, and free without that torturing dissection which we have seen so long practised of cutting into the stricture, you may put him into bed or finish the operation. I prefer seeing him recruited before I proceed further. You may destroy the stricture at your leisure (because there is now no danger to the bladder) and having passed the catheter through the stricture you divert it into the bladder, a matter of no difficulty. There is no greater triumph than a cure thus conducted." If Sir Charles Bell's illustrious life had lasted him to re-edit that striking passage, and to enrich it with further fruits of his ever keen spirit of observation, his genius, I feel assured, would have dealt still more decisively with "that torturing dissection" which purports to divide the stricture, would not have remained content with merely reserving it for "leisure" as something to "finish the operation," but would unequivocally and finally have set it aside as a mischievous inheritance from his predecessors.

It may be proper for me to add that the practice which is

recommended in my lecture of 1852 is that which I continued to recommend and to follow during all the long remainder of my teachership in the Hospital, and that all subsequent experience strengthened my opinion in its favour.

[The following extracts are from Mr. Simon's lecture delivered at St. Thomas's Hospital in 1852, now reprinted in the Hospital Reports.]

Suppose the necessity to be established for your giving an artificial passage to the urine;—suppose one of the three conditions to be present which I have stated to you; that you cannot procure any discharge whatever by the natural channel; or that your patient is suffering urgent constitutional distress from the insufficiency of such relief as you have procured him; or that the perineum and genitals are beginning to swell with extravasation of urine;—now, what course have you to adopt?

The operation which for a great many years has been prevalent here, and, indeed, in most London schools of surgery, has been the following.—(1) A catheter or sound has been passed up to the seat of stricture, at or near the bulb of the urethra; (2) a long cut has then been made in the raphe of the perineum, reaching down to the urethra, and opening it behind the seat of stricture; (3) the urethral incision has been prolonged forwards, towards the point of the catheter or sound, so as to split open the contracted portion of the canal; and finally (4) all impediments being overcome, a large catheter has been conducted along the urethra into the bladder, and there secured by appropriate bandages.

You will find this operation fully described in Mr. South's translation of Chelius, and spoken of as the practice of the Borough hospitals for the past thirty or forty years. And, if you wish to see the operation in its most favorable aspect, you cannot do better than observe it in Mr. South's hands, who has had great experience in the proceeding, and who executes it with all the care and patience which are indispensable for its success.

Professor Syme, of Edinburgh, who is a great authority in such matters, speaks of this operation as "protracted, uncertain, dangerous, and unsatisfactory." Looking to its average performance, I must say my experience would justify this censure, It is *protracted*, for the patient undergoes severe manipulation during a period, of which the mean would be twenty to thirty minutes. It is *uncertain*, for the division of a stricture or strictures to which one is so imperfectly guided, cannot be accomplished with facility; nor can one feel sure, under the most favourable circumstances, that one's scalpel has

hit the exact line of a canal contracted (perhaps for an inch of its length) to such narrow dimensions as scarcely, if at all, to admit the smallest catheter. It is *dangerous*, because, in addition to the sources of risk just adverted to, large hemorrhage not unfrequently contributes to exhaust the patient; and further, because in many cases (as where the urethra is contracted throughout its whole spongy portion) a catheter cannot be maintained in the passage, without prolonging that state of pain and irritation which already have set life in jeopardy. And *unsatisfactory* it must be on all these grounds. For what can be more so, than to conclude a severe and dangerous operation with uncertainty as to whether one has accomplished that very object for which the severity and the danger were encountered?

These objections apply to the proceeding as practised by the best—I mean the most careful, operators. In other than good hands, it is a very horrid affair: metallic instruments are thrust in all directions; they leave the canal at one place, and re-enter it, by perforation, at another; or they pass up to the hilt—one shudders to think where, and draw no water; the rectum, the prostate, even the bladder, undergoes injury in these violent efforts, and the patient is eventually sent to bed, it may be with his bladder unemptied, having his chance of cure sensibly diminished by the infliction of so much unnecessary mischief.

We cannot be surprised that many surgeons have taken refuge from the precarious chances of this operation in the comparatively simple and secure process of tapping the bladder by the rectum or above the pubes. I shall presently describe to you the operation which, generally speaking, I consider a far preferable alternative even to these. But, before examining their comparative merits, I have still something more to say in respect of the last.

Within these few years, Professor Syme has introduced a method of dealing with obstinate strictures, by dividing them on a director previously passed through the constriction; and you may ask whether the adoption of this manœuvre would be applicable to the cases we are considering, so as to remove the objections I have expressed to the operation of dividing the stricture without any such assistance? I think not. The cases heretofore treated by Mr. Syme's operation have not been cases where the primary consideration is to give immediate relief to a distended bladder, or to provide against advancing extravasation of urine; and in cases such as these there are generally circumstances which would render the director inadmissible. If the urethra is impervious to a small catheter, it is not likely to yield to this other instrument; if the canal has ulcerated, so as to communicate with infiltrated and sloughing

tissues, or is riddled with false passages, the director would be not unlikely to prove a treacherous guide. Here and there one might find a case in which (supposing division of the stricture to be our desideratum) Mr. Syme's principle would admit of application; but, speaking generally, I may repeat that his proceeding relates to quite a different class of cases.

But, if that "protracted, uncertain, dangerous, and unsatisfactory" operation, which I have described, could admit of serviceable modification by Mr. Syme's proceedings, there is yet another reason, I think, which would induce us to reject it.

The operation held its ground because of its alleged completeness. The notion of dividing (and therein *curing*) the stricture, at the same moment as one gave relief to the distended bladder, was indeed charming. But, of late years, surgeons have discovered, that this seductive completeness had in it a practical fallacy. The division of the stricture was the sheerest superfluity. Let the bladder be relieved any how, by the perineum, by the rectum, by the pubes; merely let the stricture for a while be undisturbed by the constant irritation of urine urged against it from behind; and there speedily occurs a spontaneous permeability of the canal. The stricture wants no cutting. It loosens itself.

So remarkably does this effect belong to the withdrawal of pressure from the stricture, that it arises, not only when the surgeon has made an artificial outlet for the water, but also under far less favourable circumstances; namely, where the urethra has given way behind the stricture, and where the bladder expends its chief expulsive force in driving the urine into surrounding textures. "The first effect of this mischief (says Sir Benjamin Brodie) is to relieve the patient's sufferings; there is no more straining, and the spasm of the stricture, no longer excited by the pressure behind, becomes relaxed, so as to allow some of the urine to flow by the natural channel." Further, in the very numerous cases where the endeavour to divide a stricture has been defeated by the difficulties I have adverted to, and where (contrary to the performer's intention) the operation has not advanced further than the stage of cutting into the bladder or urethra somewhere behind the obstruction, the same loosening of the stricture has been observed to ensue, as though it had actually been divided.

Surely, it cannot be desirable to incur difficulties and dangers in attempting to divide a stricture, when the same advantages spontaneously arise without that division being accomplished.

These considerations have led me to the *modified perineal operation*, which you have seen me perform in various instances, and which consists simply in this:—I open the urethra by punc-

ture, or by very small incision, immediately in front of the prostate gland. I run a short elastic catheter along this wound to the bladder. I leave the stricture quite untouched for ten days more or less, during which the urine flows entirely by the perineal catheter. At the end of this time, I find the stricture ufficiently relaxed for me to begin its dilatation with a middle-sized instrument; and I thus obtain all the advantages assigned to the severer and more difficult measure, while adopting an operation of extreme slightness and security.

I have already intimated to you that many surgeons, feeling the risks and difficulties which are inseparable from the ordinary perineal operation, have chosen rather to tap the bladder, in such cases as we are considering, either above the pubes or by the rectum. Obviously, on the principles which I have stated to you, either of these proceedings might give very satisfactory results. The bladder would be effectually emptied, and the stricture relieved from irritation; supposing the urethra to have given way, diffusion of urine would be prevented; and neither of these operations can be considered very difficult or very dangerous.

If, therefore, my choice lay between the ordinary perineal operation and these other expedients, I should not hesitate to prefer one of the latter. But the modified perineal operation which I advocate is still simpler and safer.

I admit, for instance, that tapping the bladder through the rectum is not a very difficult or very dangerous operation. A man of ordinary skill can hardly bungle it. Yet it is not quite so simple a matter as driving your trocar into a hydrocele. It requires some practice and dexterity. I have known an able surgeon, in attempting it, make two successive stabs; the first *went by the side* of the bladder, the second *transfixed* it. And I should doubt whether, even under the most skilful management, the peritoneum would always be so safe from injury as the advocates of the operation believe.

But assuming, for argument's sake, that the manipulation shall never miscarry by any such slips as these, I can still scarcely approve of the operation. To bore a hole through the rectum would seem at first blush, a roundabout way of emptying the bladder. It strikes me as an awkward and unworkmanlike proceeding, to involve a second viscus unnecessary in the attempt to relieve a first. One would wish to minimise the injury of one's operation; and, if one can relieve the bladder equally well without wounding the rectum, if one can accomplish one's purpose by a direct cut through the common integuments or little more, surely one would argue *primâ facie* that the rectum should be let alone. For the wounding of the bowel cannot be a matter of indifference. The track of the trocar between

the seminal vesicles must be the seat of irritation, not often perhaps to a serious extent, but certainly sometimes. Occasionally, no doubt, an abscess forms there, aided by a little infiltration of urine; and from such a beginning as this very multiplied mischief might arise and continue. I understand there died in this hospital, not long ago, a patient who, at some previous time, had undergone elsewhere the operation in question; and in whom the irritation occasioned by it had never subsided. There had apparently been formed (in the manner just suggested) an abscess between the two openings; urine continued to flow through the rectum, with extreme discomfort and tenesmus; and the man's health was undermined by this continued suffering and irritation. I repeat, therefore, that the rectal operation, as compared with the ordinary perineal section, presents unquestionable advantages; but as compared with the modified perineal operation, it must be considered, I think, to have the disadvantage of inflicting unnecessary injury, and incurring unnecessary risks.

The supra-pubic tapping of the bladder is even easier of performance than the rectal operation, and has some other arguments in its favour. Indeed, there are cases, though not such as we are now considering, in which the bladder cannot be relieved by any other proceeding. Such are the cases in which invincible retention of urine is occasioned by tumours of the prostate: for here, obviously, no perineal incision would carry us beyond the obstruction, and the morbid growth would render tapping *per rectum* difficult or impossible.

But, as respects cases in which our necessity to operate depends on stricture and its consequences, I cannot think the supra-pubic puncture a desirable proceeding. The distance to which the contracted bladder retreats, so soon as its contents are discharged, is a matter of serious inconvenience. The areolar tissue between the bladder and the abdominal wall may easily get irritated by soakage of urine. The opposed edges of the recti would, in any such case, be an obstacle to the escape of the unhealthy accumulation. Further, notwithstanding the facility of the puncture, mischances have happened in its performance; and, both in the operation and afterwards, the posterior wall of the bladder has suffered from the trocar or the canula.

Reviewing the objections I have briefly stated, I cannot but give a decided preference to the modified perinæal operation, in all cases which admit its execution. The point of the urethra selected for the puncture is definite in its position. It is readily reached from the surface of the perineum. No important parts intervene. The subsequent escape of urine is direct. The position of the catheter causes little inconvenience. The perineal incision necessary for reaching the urethra is in

nearly all cases required by accumulations of pus and extravasated urine. In such cases nothing is wanting to relieve the bladder but to deepen this incision into the urethra itself; a proceeding surely both milder and more obvious than if, after cutting deeply into the perineum for pus and extravasated urine, one were to start *de novo* with a trocar, to tap the bladder by the rectum or above the pubes.—*St. Thomas's Hospital Reports, Vol.* x., 1880, *p.* 139.

47.—ON THE IMMEDIATE TREATMENT OF STRICTURE OF THE URETHRA.

By Christopher Heath, Esq.

Mr. Barnard Holt has defended his method of treatment of stricture from the aspersions unfairly cast upon it. Having witnessed the great success of Mr. Holt's method whilst his colleague at the Westminster Hospital, I have continued to adopt the proceeding in suitable cases ever since, and I am well satisfied with it. Mr. Holt does not profess that his operation will "cure" what is acknowledged on all hands to be practically an incurable disorder; but I believe with him that a "split" stricture contracts less rapidly than one dilated or divided, and that when it has been allowed to contract it can be readily restored to full size. Since it is allowed that in cases of old-standing stricture, with disorganised kidneys, the mere passing of a catheter may kill by inducing suppression of urine, it is not surprising that death may occasionally follow the use of Holt's dilator under similar circumstances, as occurred to a private patient of my own two years back. Again, if the dilator unfortunately enters a false passage, which is then split up, a consequent death cannot be fairly attributed to the method, though it may be to the operation.

I have before me the very carefully compiled printed annual Surgical Reports of University College Hospital for the last nine years, in each of which a special table of cases of stricture is given. I have collated these carefully, excluding only cases of extravasation of urine (admitted as such), and cases in which no treatment was adopted, with the following results:—

Treated by dilatation	157	cases with	13	deaths.
,, internal urethrotomy	130	,,	7	,,
,, external urethrotomy	18	,,	4	,,
,, Holt's method . . .	32	,,	4	,,
,, other dilators . . .	8	,,	2	,,
Total cases	345		30	

It should be mentioned that the cases of internal urethrotomy include a large number of cases of simple "meatotomy," and

also operations by various methods. I believe I may claim nearly all the "Holt's," and certainly the four deaths, two of which were due to false passage, and two to pyæmia. It should also be understood that Mr. Erichsen and Sir H. Thompson gave up all charge of patients early in 1875.—*Lancet, Sept.* 25, 1880, *p.* 516.

48.—THE IMMEDIATE TREATMENT OF STRICTURE.

By Rawdon Macnamara, Esq., Surgeon to the Meath Hospital, and to the Westmoreland Lock Hospital, Dublin.

Being the surgeon who first introduced to the notice of the profession in this city Mr. Holt's plan of treating stricture, perhaps you will kindly permit me to say a few words on the subject, and to place on record in your pages the result of my experience of a number of cases, now to be counted, not by units but by hundreds. During all the years I have treated stricture on the immediate plan I have never had one fatal case, nor have I ever witnessed any more untoward consequence of the operation than, in some very exceptional cases, rigors. Every surgeon of experience has met with individuals who could not tolerate the attempt to introduce an ordinary instrument without, as the result, the supervention of rigors. Cases of this kind have come under my care, yet in many of these have I used Mr. Holt's plan without rigors ensuing. This I account for by my having used proper precautions and treatment. Early in this year a gentleman, a victim to stricture, consulted me. That his case was one of no ordinary difficulty can be certified by a gentleman who deprecates in no measured language Mr. Holt's plan of treatment, under whose care the patient was for some weeks in London. Every attempt to introduce an instrument was followed by such spasm as for hours to render him unable to void one drop of urine. I placed him under the influence of methylene, introduced the dilator, and forcibly dilated his stricture to such an extent as to allow of the passage of a No. 10 catheter (Weiss's gauge), a sized instrument which he is now able to pass for himself; yet he did not experience the slightest subsequent trouble. This gentleman called on me within the past week, and told me that, though a perfect stranger to Mr. Holt, he had twice called at his house, but was not fortunate enough to see him; the object of his visit being to express his gratitude to Mr. Holt for having introduced a plan of treatment whereby a life of misery had been converted into one of thorough enjoyment.

That fatal results may be ascribed, but erroneously so, to Mr. Holt's treatment, will be illustrated by what I am now about to state. Last month I had arranged to operate on two cases

of stricture on the same morning in the Meath Hospital. On arrival I found one of the patients "seedy," and accordingly put him back, but operated on the other, who left the hospital a few days afterwards master of a No. 10 gum-elastic catheter, which, before my class, he himself introduced into his bladder. But what became of the other patient? The same day he was carried out of the hospital dead. Double pneumonia—rapid effusion; and in spite of the most energetic treatment the poor fellow succumbed. Had I been imprudent enough to operate that morning on that man, doubtless Mr. Holt's operation would have been credited with (or rather discredited by) another fatal result.

In conclusion, I may be allowed to add that my operations have been conducted in the presence of large classes of students in the Meath Hospital, as well as in private. Were my results less favourable than I have here recorded, there would be plenty of witnesses to bear evidence against the accuracy of my statements.—*Lancet, Sept.* 25, 1880, *p.* 516.

49.—THE IMMEDIATE TREATMENT OF STRICTURE.

By James R. Lane, Esq., Surgeon to St. Mary's Hospital, London.

Having had some considerable experience in the treatment of stricture by sudden and forcible dilatation, I am anxious to corroborate the testimony of Mr. Barnard Holt, in your last impression, as to the safety and efficiency of that proceeding.

I wish to do so because in comparing it with internal urethrotomy it has, in my judgment, been rather unfairly treated by some of the advocates of the latter method.

The disparaging remarks to which I allude consist not so much in argument as in vague condemnation on account of its supposed dangers, and unsupported insinuations of bad faith on the part of those who practise it in concealing unfavourable results. Thus in the late discussion at Cambridge one speaker is reported to have said: "He entirely agreed with the remarks that rupture was a dangerous proceeding. He never did it himself, but he had seen a good number of cases that went to the bad from it, and believed that such a rupture must lead to a traumatic stricture of the worst kind." What these vague statements amount to is shown by Mr. Holt in his letter of last week.

Another speaker on the same occasion said: "There were surgeons who still practised immediate dilatation, and that they did so showed that they were but imperfectly acquainted with the rationale of the operation, and were not aware of the great mortality attached to it." This is certainly true as regards

myself. I know little and care less about its rationale, but am content to judge it by its results; while as to the great mortality alleged, I shall disbelieve it until I see some evidence in its support.

The same gentleman further says that, "had the deaths which have occurred after forcible dilatation been published, the operation would long ago have received its *congé;* and he thought the advocates of that method had not acted straightforwardly in omitting to publish them." This is an imputation of bad faith which, entirely unsupported as it is, ought to be discountenanced as altogether out of place in a scientific discussion. I should like to know why this propensity to the *suppressio veri*, if it has any existence, should be supposed to appertain to those who use the dilator rather than to the urethrotomists.

My own experience of the treatment by forcible dilatation may be briefly expressed. I have practised it in all suitable cases of obstinate structure, both in hospital and private patients for the last fifteen to twenty years, and though I have kept no numerical account, I can safely say that they amount by this time to many scores. In no single instance have I met with a fatal result, or with any subsequent symptoms which gave me cause for serious uneasiness. My experience, in fact, coincides exactly with that of Professor Macleod of Glasgow, who said at the late meeting at Cambridge, "that he had never seen any complication, and no possible danger, follow the use of Holt's dilator when used in cases fitted for it."

I constantly see my colleagues at St. Mary's Hospital using the dilator, but very rarely the urethrotome, and though I, of course, only speak for myself, I assume that they would not continue to use it if they found their cases dying or "going to the bad" in the manner that has been alleged.

I have no wish to decry internal urethrotomy. I have never practised it, and therefore cannot speak from personal experience, but I accept, without reserve, the statements of such authorities as Sir Henry Thompson and Mr. Berkeley Hill as to its satisfactory results and its freedom from danger. I adhere to immediate dilatation because I believe it to be a less formidable proceeding, and because if urethrotomy would do all its advocates claim for it, I do not see that I should get better results than I have been accustomed to obtain from dilatation.

Deaths may now and then occur, and serious consequences may follow after either operation (as they may happen after any surgical proceeding, however slight), but there is no evidence, that I know of, to show that dilatation is more liable to them than urethrotomy. Bad results will be exceedingly rare in both if cases unsuited to any operation at all are carefully excluded.

No treatment of stricture yet known, whether by gradual or forcible dilatation, by internal or by external urethrotomy, will prevent a recurrence of the complaint, unless the patient will persevere in the use of instruments for a lengthened period. But I have not myself found these relapses more early or more severe in the intractable cases demanding the immediate treatment, than in the milder ones which are amenable to gradual dilatation, or than the more severe ones which are subjected to external urethrotomy, as advocated by Syme, in which latter, as Sir H. Thompson observes, "the diseased structures constituting stricture have been entirely divided, and in a way more certainly complete than any *internal* urethrotomy can offer."—*Lancet, Sept.* 25, 1880, *p.* 517.

50.—ON THE TREATMENT OF GLEET AND THE PREVENTION OF STRICTURE BY IRRIGATION OF THE URETHRA.

By Reginald Harrison, Esq., F.R.C.S., Surgeon to the Liverpool Royal Infirmary.

There are very few practitioners who have not at times experienced the greatest difficulty in the cure of gleet, in arresting the small quantity of urethral discharge which persistently, and in spite of all treatment, local and general, remains after the acuteness of a gonorrhœa has abated. Many patients have in despair given up the attempt to obtain a cure, and so have incurred the risk of a stricture as a consequence.

And yet what is all this trouble about? Simply a slight purulent discharge from a chronically inflamed patch in the urethra, which, by reason of its position, presents difficulties in its treatment. A state of affairs which, if it occurred in one of the more accessible spaces in the body, such as the mouth, nose, or larynx, where remedies can be directly and unerringly applied, there would not be the least difficulty in curing.

The conclusions I would lay stress upon are these:—1. That the large majority of strictures, excepting those caused by injuries to the urethra, are preceded by more or less chronic gonorrhœa or gleet. 2. That the most frequent seat of stricture corresponds with that of gleet—namely, the subpubic or deeper portion of the urethra.

Assuming these conclusions to be true, which I do, not only from my own personal observation but from that of others who have had sufficient opportunities of forming an opinion, it certainly looks as if the persistence of gleet and the formation of stricture were due to the imperfect means hitherto adopted for dealing with the bulbous and membranous portions of the urethra when chronically inflamed; in fact, that the disease

escaped treatment altogether. Surely this is more rational than to regard the affection as an incurable one, or to propose to reverse the sequence of pathological events. Why do not women suffer from gleet or from stricture, or do so in such small proportion as not to alter the rule? Simply for the reason that the parts involved are easily to be got at for the purposes of treatment. The endoscope, moreover, has shown that the deeper portion of the urethra is the part affected in gleet, the appearance presented being granular and similar to what is observed in some forms of ophthalmia. Mr. Gould has also clearly demonstrated that this part of the canal, by reason of its position, is favourable to the retention of diseased secretions and other sources of irritation which would be likely to keep up the gleety discharge.

All these observations seem to point to a conclusion that our means for efficiently applying remedies to the sub-pubic urethra are more or less imperfect, and that if we could deal with this part as directly as we do with the anterior third of the canal, the treatment of its disorders would be as successful as that of the other accessible cavities and passages of the body.

If I am correct in my assumption that the urethra at, and posterior to, the bulb (excluding the prostate) is the seat of the chronic inflammation we call "gleet," how utterly inert our treatment of it must be by injections as usually and popularly practised.

In the first place, I question whether an injection as used with an ordinary glass syringe ever succeeds in reaching the bulbous or membranous portions of the urethra, and even if it does so, as it may in a few instances when practised by old hands, its contact with the membrane is so brief as to be really useless. The conventional mode of injecting, so far as the deeper portion of the urethra is concerned, is just about as efficacious as a gargle would be if the patient slyly took a mouthful of the fluid prescribed, retained it for something like a minute, and then spat it out, repeating this performance twice or thrice a day. What possible service would this render to an ulcerated throat?

For some time past I have been employing in the treatment of gleet a very thorough irrigation of the urethra throughout its whole length by means of an apparatus which I have had specially constructed for the purpose. So far the results obtained have been highly satisfactory in speedily curing the gleet and consequently preventing the formation of stricture. In carrying out my views I have taken a hint from what is now done with so much benefit in the case of the nasal passages, a thorough irrigation or washing out of these by a suitable con-

trivance being substituted for the imperfect medication by syringes, brushes, snuffs, and such-like expedients, which were formerly prescribed with so little advantage. Many of the diseases of the nasal spaces which heretofore were considered most intractable are by the improvements in mechanical contrivances referred to rendered perfectly amenable to treatment. To effect this with the urethra I make use of a small Higginson's syringe, and a sufficiently resisting vulcanised india-rubber catheter. I direct the patient twice or thrice a day to douche most thoroughly his urethra by means of these appliances, entirely discarding for the purpose all his notions about the old glass syringe arrangement as being utterly unfitted to cure a gleet. If the patient does not from the first recognise the necessity of submitting his urethra to a complete medicinal washing, his efforts, like his previous ones, will probably be ineffectual.

I direct the patient to denude himself of his nether garments, and, seating himself in a chair with his pelvis inclined forwards to the edge, to introduce the soft catheter and gently pay it into the urethra, having previously anointed it with some vaseline. If the patient finds that he can introduce and retain more easily a stiffer catheter, he may substitute one of the French instruments in the same way, of the required length and size, taking care that the eye is within half an inch or thereabouts of the end. Having done this, he attaches the catheter to the small Higginson's syringe, which is connected with a tumblerful of the fluid to be used, tepid. I generally make use of the sulpho-carbolate of zinc, in the strength of about half a teaspoonful to a pint of water. The patient steadying the catheter in his urethra with his left hand (not squeezing the meatus around it), slowly compresses the ball of the syringe with his right hand, the vessel containing the fluid to be injected being placed by his right side, or attached, as it may be done by a bottle arrangement, to the feeding-pipe of the syringe. In this way the patient is directed to continue using the apparatus until the urethra has been completely washed out; the fluid, after it has circulated between the walls of the urethra and the catheter, escaping through the meatus, where it is received into some convenient receptacle.

I may perhaps have been unnecessarily explicit in referring to all these details; but these being thoroughly carried out, and in a manner very different from the furtive and speedy action which characterises the proceeding as effected with the glass syringe, is essential to success.

There are one or two points which remain to be noted. The catheter should be six inches in length, and be completely passed into the urethra, merely allowing room for the connection

with the syringe-pipe. The catheter should not be larger than a No. 6 (English gauge), so as to allow plenty of room between it and the walls of the urethra, in which the injected fluid can circulate. The eye in the catheter should not be too near the end, or too large, and its edge should be bevelled so as not to scrape the urethra. For smoothness in introduction, Tiemann's (of New York) velvet-eyed india-rubber catheters are a great improvement on the English make, where the eye of the instrument is punched out without being bevelled. Whilst injecting the fluid its escape may suddenly be stopped for a few seconds; the doing of this forces the fluid into the small lacunæ of the urethra, and so cleanses and medicates them. The quality of astringent in the fluid should not be too great: to cleanse and astringe without paining, or even smarting, is what is required. The operation should be repeated at least twice in the twenty-four hours. The appliances used are so simple, that they can be brought into action in the course of a patient's ordinary bathing arrangements without inconvenience. I mention sulpho-carbolate of zinc as being the most generally appliable and useful astringent for these cases. Sulphate of zinc, borax, acetate of lead, quinine, and carbolic acid, all have their uses, according to circumstances, in these cases.—*Lancet, May* 15, 1880, *p.* 760.

51.—ON THE RADICAL CURE OF VARICOCELE BY THE GALVANIC ECRASEUR.

By A. Pearce Gould, Esq., M.S., F.R.C.S., Assistant-Surgeon to the Westminster Hospital.

Although there are very many cases of varicocele in which no treatment, or only palliative measures, are required, you will meet with others in which it will be your duty to undertake the permanent or radical cure of the varix. These cases are as follow:—1. Where the testicle is atrophying. 2. Where the varicocele is double, especially if an examination of the semen shows an absence of spermatozoa, or the patient, being married, is sterile. 3. Where the opposite testicle is lost or useless from tumour, orchitis, epididymitis, or injury. 4. Where the varix is large and increasing, in spite of palliative treatment. 5. Where the varix causes much pain, or interferes with proper exercise and necessary work. 6. Where it is the occasion of marked mental depression. 7. Where the varicocele prevents acceptance for either of the Government services.

There are many plans for securing the radical cure of varicocele, including castration, excision of the veins, the actual cautery, forcipressure, and ligature. The ligature is the method most commonly adopted, and has been variously modified by

Ricord, Vidal, Erichsen, Wood, and H. Lee. (These methods of treatment were then described.)

Of the efficacy of these treatments there can be no doubt, but unfortunately they have two drawbacks—the pain attending them, and a certain amount of danger. For a long time surgeons avoided as far as possible any interference with veins, and although veins are now ligatured almost as freely as arteries, there is no doubt that diffuse thrombosis, embolism, and septic poisoning are more liable to follow injuries of veins than of arteries. This being so, it is plainly the surgeon's duty to avoid in every possible way any irritation or disturbance of an injured vein, and it is because this principle is not sufficiently carried out that the usual modes of treating varicocele have been attended with serious and even disastrous results. The daily twist of Vidal's pin, and constant traction of Wood's spring, are not only painful, but opposed to the great principle that demands perfect rest to all inflamed and injured tissues, and veins in particular, while, in Lee's operation, the presence of two harelip-pins transfixing the scrotum is apt to set up œdema and inflammation, and their removal is not without risk of embolism. That these are no imaginary fears is evident from the published results of these and analogous treatments. Gant says that the results of the operations are "variable," and include diffuse inflammation and sloughing of the scrotum, suppuration of the testicle, phlebitis, pyæmia, and death; Erichsen records two deaths from the twisted suture; Gross had one death after ligature; Sir E. Home had one nearly fatal case; Escallier mentions two fatal cases of phlebitis, and Curling speaks of three cases of serious results, two of which were fatal. Some years ago the censor of one of the chief London hospitals died from pyæmia after Lee's operation. This list by no means includes all the accidents of these treatments—it makes no mention of the pain suffered, or of the inflammatory œdema and suppuration of the scrotum.

It was with the hope of avoiding these complications that I was led, now more than two years ago, to try the plan of subcutaneous division of the veins by means of a platinum wire heated to a red heat by electricity. The procedure is, as you have seen, very simple. First, feel for the vas deferens, and grasp the veins in front of it, and nip in the scrotum with the left thumb and forefinger; transfix the scrotum at this spot between the duct and the veins with a narrow bistoury, and pass a needle armed with a platinum wire in the track of the knife; then return the needle through the same apertures, but this time in front of the veins between them and the skin. Of course, if the vas happen to be in front of the veins, as was the case in that of W. C., shown to-day, you modify the procedure

a little. In this way you have the veins in a loop of the wire. It is better to make a puncture with a knife rather than merely to transfix with the needle, for the veins are looped up cleaner, there is not the same liability to include a portion of the skin in the noose as in the latter plan. Then attach the ends of the wire to the écraseur, and connect with the battery, using sufficient cells to cause a faint hissing noise; one cell of Grove's battery, or at most two, is sufficient. This step must be done deliberately; I have taken as long as five or six minutes over it. To protect the skin from burning, let some cold water trickle over it while the wire is burning its way through the veins. The after-treatment consists in perfect rest in bed for a few days, with the scrotum supported on a broad strip of strapping fixed across the front of the thighs. I have three times operated without anæsthesia, but the pain may be severe, and I prefer to have the patient under the influence of ether. After recovery from the anæsthesia there is an entire absence of pain, and this perfect freedom from spontaneous pain continues uninterrupted throughout the convalescence. A few hours after the operation the knobby feel of the varix is replaced by a soft even swelling, which lessens and hardens, and at the end of forty-eight hours is usually to be felt as a hard lump, about the size of a big marble. This is tender on pressure. By the end of a week it has lost its tenderness, and has shrunk to three-quarters its original size. The veins below can still be felt full, but not compressible, the blood in them has by that time coagulated, and they become smaller and firmer, until ultimately a small pea-like induration in front of the vas is all that is left, and even this may disappear, and no trace of the varix or operation be left, as in W. S.

I have employed this method eight times, each time the varix has been cured, the symptoms complained of relieved, and no mischief to the testicle has followed. These eight cases have shown me that there are three things to be carefully avoided. The first is hurry in the section of the veins; twice a few drops of blood have followed the escape of the wire, but only so little as to require nothing more than lint or cotton-wool to be placed over the wound; in neither instance was there any hematocele. The second is to operate well above the tunica vaginalis; in one of my cases acute hydrocele was lighted up, it quickly subsided under belladonna fomentations. The third is burning of the skin, leading to a small slough; although there is nothing of serious moment in this slough, it is of course best to avoid it, and if the skin is incised and kept cold and the loop of wire not brought too small it can generally be saved.

I can recommend you to practise this operation, first, because of its entire painlessness after the few moments of its actual

performance, and, secondly, because it fulfils the physiological indications better than any other I know of. My cases at present are too few to prove by statistics that it is less dangerous to life than those operations I have mentioned, but they are sufficient to show that the operation is simple, effectual, and introduces no new danger, while it is obviously free from the sources of irritation common to other methods.

The section of the veins is completed at once; there is no foreign body liable to set up inflammation left in contact with the healing veins, which are allowed to remain at perfect rest, while their seared ends are becoming permanently closed. As you are aware, the closure of an open vessel by the hot wire or iron is usually considered a particularly safe plan. There is also no interference with the skin of the scrotum, as in Lee's operation; no compression of the scrotal vessels, no œdema.

The only other method that I should at all recommend to you is the use of the catgut ligature applied to the veins subcutaneously. I have had no experience in it, but it has been done with success. I think the heated wire is preferable, because the catgut ligature is rather uncertain in its action; it may soften very rapidly and then fail to occlude the vessels, or it may not soften at all and cut its way through the veins like an ordinary hempen or silk thread, or remain and subsequently light up inflammation. These accidents are only occasional, but we should none the less be on our guard against them, and give the preference to a plan of treatment which is free from them. In none of my eight cases has any slough separated from the veins; the eschar formed has been absorbed by the living tissues. I show you to-day four cases at varying periods after the operation illustrating their progress.

1. W. J., aged seventeen, a large left varicocele, which he had noticed for "several years," left testicle smaller than right, complained of dragging pains in scrotum and up to left loin. Operation June 21st, 1879; left hospital June 28th. A firm induration the size of a marble felt; not tender; veins below plugged.

2. F. L., aged twenty-four, single, injured left testicle five years ago; first noticed varicocele three years ago, after an attack of clap, since then the pain and swelling had steadily increased in spite of wearing a suspender. No constipation; external piles for two years. Operation May 28th; left hospital June 8th. The induration is very hard, the size of a horse bean; veins below are firm and shrinking.

3. W. C., aged thirty, single, very large left varicocele, noticed suddenly in June, 1879, while bathing. Pain in scrotum and groin had increased of late; testicle smaller than right. Operation May 1; left hospital May 7; delayed on account of

a slough of skin. Induration now small; veins below cannot be felt; testicle has regained its former size and is a little larger than right.

4. W. S., twenty-one, a small varicocele noticed some years; scrotum not lax; considerable pain; frequent seminal emissions and mental depression. Operation Sept. 29; left hospital Oct. 9. No trace of dilated veins or of the seat of the operation to be felt. All symptoms relieved.—*Lancet*, *July* 17, 1880, *p.* 83.

AFFECTIONS OF THE EYE AND EAR.

52.—ON DR. THOMSON'S AMETROMETER.

By R. Brudenell Carter, Esq., F.R.C.S., Ophthalmic Surgeon, St. George's Hospital.

I am desirous to call attention of the profession in this country to a very ingenious instrument, which Dr. Thomson of Philadelphia, its inventor, has named the ametrometer. It is intended to measure the refraction of the eye without the aid of lenses; and it appears likely not only to accomplish this object, but also to effect a great saving of time for those who are habitually engaged in such investigations.

The ametrometer consists of a graduated bar, about a foot long, pivoted near one extremity, and carrying two very small gas jets, one of which is stationary near the pivot, while the other slides freely to and fro along the bar. The patient is placed five metres from the instrument, and the lighted gas jets are separated, the bar being in a horizontal position. To an emmetropic eye, or to an ametropic eye fully corrected, the two flames will appear clearly and sharply defined; but to an unaided ametropic eye, each flame will appear surrounded by a luminous band or halo, produced by the dispersion circle on the retina. The width of this band will be the measure of the ametropia, the amount of which may therefore be read off upon the graduated bar by bringing the flames so near together that the margins of the two luminous bands come into contact. The patient is then directed to move a slip of coloured glass slowly over the pupil, from the temporal side inward. If the case be one of hypermetropia, the temporal side of the halo will remain white, while the nasal side is coloured by the glass; and, if it be myopia, the reverse of these conditions will obtain. In astigmatism, the luminous bands will be elliptical instead of circular; and, by turning the bar upon its pivot, the two ellipses may be brought into such a relative position that their major axes, if touching, would be in a continuous line. The bar then coincides with the meridian of greatest ametropia,

which may be measured by bringing the bands into contact in the ordinary way. The instrument is furnished with a graduated arc, upon which the angular position of the bar may be read off, and it may then be turned to a position at right angles with the former, and the refraction of the opposite meridian measured in turn. With a patient of ordinary intelligence, the examination may be completed with great rapidity. It is hardly necessary to say that the eye examined must be fully under the influence of atropine or of duboisin, and that the other eye must be covered.

The graduation of the bar is such that the refraction may be read off in inches upon one side of it, and in dioptrics upon the other. For the latter, each division measures two and a half centimetres, and is again subdivided into two.

In testing upon myself unknown degrees of ametropia and astigmatism, artificially produced by lenses, I have found the indications of the instrument perfectly accurate, but I have not yet had sufficient opportunities of observing how far it is to be trusted in the actual ametropia of patients. In certain eyes, probably from irregularities of refraction in their lenses, the diffusion halo is extended in some directions by prolonged rays, and some care will be required in causing patients to discriminate between these rays and the boundary of the diffusion halo itself. On this and on some other points of interest I shall hope to be able to make observations worthy of future publication; and my present object is to enlist the aid of others in the work. The ametrometer either is, or shortly will be, obtainable from Mr. Hawksley.—*Lancet*, *July* 17, 1880, *p.* 91.

53.—ON OPERATIONS FOR CATARACT BY DISCISSION FROM BEHIND.

By Professor Wharton Jones, London.

[In some cases of cataract Mr. Wharton Jones operates by discission from behind. In a clinical lecture on such a case at University College Hospital, he said:]

This cataract was of the ordinary hard kind met with in old persons, and the operation performed was by my method of discission from behind. This was a third operation. The first was performed about twelve months ago, and consisted simply in *lacerating the posterior wall of the capsule* of the cataractous lens. For this purpose I passed a curved, spear-headed cataract needle into the eyeball by piercing the sclerotica on the temporal side, at a point about one-sixth of an inch from the margin of the cornea, and half way between the insertions of the external rectus and inferior rectus. Pushing now the spear-head on in the vitreous body, as if towards the

centre of the globe, I next turned its point against the posterior wall of the capsule, and rotating the handle of the instrument between my finger and thumb, freely lacerated that membrane, including, of course, the corresponding layer of the hyaloid, and at the same time slightly broke up, or rather scratched, the lenticular substance from behind, and then withdrew the instrument.

This laceration of the posterior wall of the capsule was the same as that which you saw me perform yesterday on another woman, aged fifty-six.

The second operation on this old woman was performed about six months ago, just before the hospital was closed for repairs. The woman having lately presented herself again at the hospital, I took her in for the purpose of performing the third operation—namely, breaking up the lenticular substance from behind for the second time. The pupils being dilated, I found on examination that the lens on the left eye especially had become much diminished in bulk by absorption, and that the patient could see distinctly the shadow of my hand held up before her. I had operated twice on the right eye last year at the same time that I had operated on the left, but absorption of the lens of that eye had not advanced so far. I resolved, therefore, to operate on the left eye only for the present.

The operation you accordingly saw me perform on the left eye consisted in breaking up the remains of the cataractous lenticular substance from behind, and then lacerating the anterior wall of the capsule. The cataract needle being introduced into the eye in a manner exactly similar to that which I have just described as having been followed on the first occasion, when I simply lacerated the posterior wall of the capsule, I next turned the point of the instrument against the back of the lenticular substance, which proved so friable that it was easily broken up into fragments by two or three rotations of the needle, as you saw. This being done, I lastly pushed the point of the needle forwards until it was seen through the pupil, and in the course of this manœuvre lacerated the anterior wall of the capsule. When the woman was allowed to open her eye a few minutes after the operation, you heard her say that she could see objects, which no doubt was true, as there were in the pupil clear spaces between the fragments into which the friable lenticular substance had been broken up. These fragments being exposed to the solvent action of the vitreous humour from behind, and of the aqueous humour from the front, have already almost entirely disappeared by absorption. On the third day after the operation, and on every day of visit since, you have heard the patient repeat that she could see you all around her. With a cataract glass of four and a half inches focus she can recognise

my features perfectly distinctly, and with a cataract glass two and a half inches she can see to read.

In the case of the man before spoken of, on whom I performed the extraction, this my operation by discission from behind would have been a perfectly appropriate operation; but, as the clearing of the pupil would have been a slower process, I deciding on extracting the cataract, as the man was anxious to get back to work as soon as possible, and because the otherwise healthy appearance of the eye gave promise of a good result.

My operation for cataract by discission from behind is described in the last edition of my treatise on Ophthalmic Medicine and Surgery. In the operation of discission, as hitherto performed, the capsule and cataractous lens are attacked from the front, the cataract needles being introduced either by puncturing the cornea and thence pushed on through the pupil against the front of the cataract, or by puncturing the sclerotica and then directing the point of the instrument forwards through the extreme circumference of the cataract into the posterior chamber, whereupon by moving the handle of the instrument from behind forwards, its point is directed backwards against the front of the cataract.

In the operation of discission from the front, whether by corneal or by sclerotic puncturation, the lenticular substance by imbibing aqueous humour is liable to swell up, and pressing forwards against the iris often excites inflammation of that structure. But supposing this danger got over, it is not uncommon to find, after the opaque lenticular substance has disappeared by absorption, opacity of the posterior wall of the capsule, constituting what is called "secondary capsular cataract." Opaque capsule or secondary capsular cataract, remember, is never absorbed, and, being tough, does not always admit of being torn up or even extracted.

One great advantage of lacerating the posterior wall of the capsule from behind, in the first step of my operation, is that the posterior wall of the capsule being thus removed from opposite the pupil, no opacity of it in that place can of course supervene to form the secondary capsular cataract I am speaking of, and which so often mars the ordinary operation of lacerating the anterior wall of the capsule, and breaking up the cataract from the front. Another advantage of lacerating the posterior wall of the capsule and breaking up the cataractous lenticular substance from behind is that the iris is saved from any irritation of pressure by the swollen lens, and therefore inflammation of it is less likely to occur. Swelling of the lenticular substance by imbibition of fluid from the vitreous body after laceration of the posterior wall of the capsule does

indeed take place, but it presses back into the soft centre of the vitreous body, and causes no irritation.

In the case of the woman on whose right eye you yesterday saw me perform the first step of my operation of discission from behind, the swollen lenticular substance I have this day seen beginning to ooze out back into the vitreous. I shall perform the second step of breaking up the lenticular substance in about six weeks, and I hope the pupil of this right eye will have cleared before the left eye, which is rapidly failing, shall have ceased to be useful.

Here let me remark that when, as in my operation from behind, the anterior wall of the capsule has been left entire and untouched, I have not found it become opaque, as the posterior wall of the capsule is so prone to do after the operation of discission from the front, in which the said posterior wall is left entire and untouched.

The common doctrine among surgeons has hitherto been that solution and absorption of the cataractous lenticular substance can take place only when it is exposed by laceration of the anterior wall of the capsule to the action of the aqueous humour; but my various cases, in which the posterior wall of the capsule alone was lacerated, and the anterior wall preserved entire, so that there never was or could be any access of aqueous humour to the lenticular substance—unless, indeed, by osmose—show that the direct action of aqueous humour is not a necessary condition for the solution and absorption of the cataractous lenticular substance. When, however, the cataractous lenticular substance has been reduced by absorption to small bulk, and there is no longer any danger of pressure on the iris by it, I usually add to my last operation of breaking up the remains of the cataractous lenticular substance from behind, laceration of the anterior wall of the capsule—from behind also, of course, as I before described in the case of the old woman upstairs—for the purpose of accelerating the completion of the dispersion of the remains of the cataract by exposing it to the solvent action of the aqueous humour as well as of the vitreous fluid, to which latter it had hitherto been alone exposed.

I will now read you three cases in which I left the anterior wall of the capsule entire and untouched in order to show you that laceration of the anterior wall of the capsule and the access of aqueous humour to the lenticular substance is not a necessary condition for the solution and absorption of cataractous lenticular substance.

1. The patient was a lady, sixty-three years of age, and the cataract the ordinary greyish-amber coloured hard cataract of old persons. At a first operation I lacerated the posterior wall of the capsule, and at a second, six weeks after, I broke up the

lens from behind, leaving the anterior wall of the capsule still untouched, and in about six weeks after that the pupil had become so cleared that, with cataract glasses, the lady was able to see quite well.

2. The patient in this case was a man about forty years old. Cataract affected one eye only, and had appeared after a blow on the forehead. It had a whitish aspect, and was of the natural consistence of the lens. In operating I did nothing more than simply lacerate the posterior wall of the capsule. The man having one eye quite good, and, therefore, in no hurry for the clearing away of the cataract in the other, I did not perform any second operation of breaking up the lenticular substance, but contented myself with watching the progress of the case. The man presented himself at the hospital now and then at my request, and I had the satisfaction to observe that the cataract became smaller and thinner by solution and absorption of the lenticular substance. The last time the man presented himself, which was a year or a little more after the posterior wall of the capsule had been lacerated, the pupil had become almost wholly clear and black. There was only a small fragment of opaque lenticular substance remaining unabsorbed, and he could see very well with cataract glasses. Of course, if I had performed the second operation of breaking up the cataractous lenticular substance from behind, the pupil would have been cleared long before. But, as I have said, the man being in no hurry, I took the opportunity which his case presented me of observing how far the cataractous lens was capable of being dissolved and absorbed under the action of vitreous fluid alone without breaking up.

3. I operated in the same way on an infant for congenital cataract in both eyes. The pupils had become clear—all with the exception of a small speck of opacity in the centre—when I last saw the case, and the infant was looking about, moving its eyes steadily. Should the patient ever be brought to me again, and if the small speck of opacity has not disappeared, I shall break it up.

To conclude. From what you yourselves have seen and from what I have now related, you will have perceived that my operation for cataract by discission from behind is the simplest and easiest for the surgeon to perform, and the safest and least severe for the patient to undergo; whilst it answers well in old persons with hard cataract as well as in young persons with soft cataract.

After the first step of lacerating the posterior wall of the capsule, it is generally necessary to perform the operation of breaking up the lenticular substance two or even three times at intervals of six weeks or two months, before the cataract

becomes completely dispersed; but this is not of much consequence, considering the mildness of the operation, and that usually little or no inflammation supervenes to prevent the patient, during the intervals between the operations, from going about as much as he had latterly been able to do. The great desideratum, on the part of the patient, is patience.

When absorption of the cataract has been completed, as we have seen it may be in six months on an average, the sight has turned out in old persons as perfect as after the most successful operation by extraction; and in young persons, more generally and uniformly satisfactory than after the common operation by discission from the front; whilst in all, the appearance of the eye has been left so natural that nothing about it could be detected to indicate that an operation had ever been performed on it at all, except the inclination of the iris backwards, necessarily resulting from the loss of support behind by the removal of the lens.—*Lancet, June* 12, 1880, *p.* 903.

54.—ON SOME POINTS IN CONNECTION WITH THE TREATMENT OF SYMPATHETIC OPHTHALMIA.

By George Lawson, Esq., F.R.C.S., Surgeon to the Royal London Ophthalmic Hospital, and to the Middlesex Hospital.

The causes of sympathetic ophthalmia are now fairly well recognised; but how to avert the disease, and how to treat it when established, are still open questions.

Before considering these two points it may be well to recall the peculiar characters of the disease.

They may be summarised thus:—

1. The disease is induced in one eye by irritation set up in the other, generally either as the result of injury, or from degenerative changes going on in a damaged or lost eye.

The disease usually commences *without* pain as a warning, though it is commonly preceded by a certain amount of irritation, slight photophobia, impairment of accommodation sufficient to give rise to fatigue of the eye, and lacrimation.

One or all of these symptoms may be present, and in an adult would probably draw attention to the state of the eye, but in a child they are not, as a rule, sufficient to lead him to make complaint, so that in children the disease is not unfrequently far advanced before it is detected.

2. The inflammation is fibrinous or plastic, and, I believe, starts in the ciliary region, and extends simultaneously to the iris and choroid. I have never seen a sympathetically inflamed eye suppurate.

3. After a variable period the tension of the globe increases,

and in this stage there is pain, which is sometimes very severe. If the disease be very acute, ciliary staphyloma will occur at this stage. Increased tension may continue for many months, and when staphyloma has commenced it will go on increasing. In the majority of cases, however, the staphyloma does not occur, and after a variable time the excessive tension subsides, then becomes normal, and ultimately the eye softens. The eye is then irreparably lost.

I. *How to avert the Disease.*—My own experience leads me to believe that if an eye have received a severe injury, and it be excised before any symptoms of irritation occur in the opposite eye, then the sound eye is safe from sympathetic ophthalmia.

There may be a few apparent exceptions to this rule, but it has not yet been my misfortune to meet them. I have seen cases in which there has been very slight irritation only in the uninjured eye, and for this the injured eye has been removed. After the operation the irritation has completely subsided, and the safety of the eye has apparently been secured. But after a lapse of time varying from a few weeks or months to many years, the irritation has recurred, and rapidly drifted into the true sympathetic irido-choroiditis, ending in total loss of the eye. These cases can, however, hardly be considered as exceptions to the general rule which I have laid down. Sympathetic irritation is closely allied to sympathetic ophthalmia, and although it presents features different from true sympathetic inflammation, yet it may and frequently does drift into it, as rodent ulcer, which in its early stages is distinct from epithelioma, may at a later date pass into and assume all the characters of this formidable disease.

Now one of the peculiarities of sympathetic ophthalmia is that it is recurrent, as indeed are all the forms of iritis, no matter how induced; and sympathetic irritation shares also this characteristic, that it is recurrent, and an eye which has once been subjected to sympathetic irritation may at some future period have a recurrence which may drift into well marked sympathetic ophthalmia.

How to proceed—(a) when the Injured Eye is totally Blind; (b) when the Injured Eye still retains some Sight.—An eye has received an injury, and sympathetic ophthalmia has occurred in the other eye: Should the injured eye be removed? Experience has convinced me that the removal of the injured eye when sympathetic ophthalmia is established in the other eye will not arrest the disease; the inflammation will go on as if the source of the primary irritation remained. Nevertheless, if the injured eye be hopelessly blind, it should, I think, be excised, in order to give the patient the chance of any benefit that might accrue therefrom.

The removal of the injured eye may arrest sympathetic

irritation, and frequently does, but it will not stay the progress of sympathetic ophthalmia. It is, therefore, doubtful whether any good will ensue from the removal of the injured eye. On several occasions, where the injured eye has retained some sight, I have seen the opposite eye destroyed by sympathetic ophthalmia, while the injured eye has ultimately so recovered that useful sight has been restored, and the patient has been able to get about without assistance. The conclusion at which I have arrived from watching these cases is, therefore, that if sympathetic ophthalmia be established, the injured eye should not be removed if it retains any sight.

How to treat the Disease.—In the curative treatment of sympathetic ophthalmia we have much to learn. At present we can do but little, as we have no means by which we can control the disease with certainty. The mode of treatment which seems to benefit in one case fails to afford any relief in another. On one point I feel quite satisfied: that operative interference in the inflamed eye is positively prejudicial in the early stages of sympathetic ophthalmia. I feel also equally certain that in the later stages when the pupil is closed and false membrane fills the pupillary space, that no operation should be done except when the eye is absolutely quiet, and there is no inflammatory action.

My present feeling is that *in the early stage* of the disease the eye should be excluded from all light. The darkest possible glasses should be worn out-of-doors, and whilst at home the patient should be in a dark room with a black bandage across the eyes, provided the bandage does not produce discomfort by occasioning heat and conjunctival secretion from the lids. The aim is to give the eye as perfect rest as possible. During this stage mercurial inunction into the temple every night may be tried and continued for two or three months, care being taken to avoid salivation by diminishing or omitting the ointment for a few days as required. At the same time quinine in from half grain to two grain doses, according to the age of the patient, combined with small doses of the extract of belladonna, may be given two or three times a day. A weak solution (0·25 per cent.) of atropine or daturine may be dropped once a day into the eye, but in the later stage of the disease, when the whole posterior surface of the iris is adherent to the capsule of the lens, I believe that all mydriatics do harm by stimulating the dilating fibres of the iris to contract when from the adhesion of the iris to the lens-capsule they cannot act. Mydriatics also favour the development of the state of increased tension which usually comes on at a later period of the disease.

In *the second stage* of the disease when the union between the iris and lens-capsule has been effected, but after the acute

symptoms have subsided and the eye is quiet, it is a question whether an operation may be attempted to improve the sight. My opinion is that if the sight is sufficient for immediate requirements, and will enable the patient to walk about without assistance, the eye should be left alone. It is the only eye, and operations on eyes sympathetically inflamed are so unfavourable that it is better to let the patient enjoy the sight he has, rather than to risk the loss of it with the prospect only of a slight improvement.

If, however, the sight is so defective as to be almost useless, and there is a fair field of vision, then an attempt should be made to improve it by an operation. I have for a long time felt satisfied that the great object to be attained in these cases is to get rid of the lens, as I have noticed that when this has been satisfactorily accomplished the tendency to the recurrences of inflammation is greatly diminished, and an artificial pupil may be afterwards made, through which the patient will enjoy greatly improved sight. The removal of the lens is an operation of difficulty. It may be accomplished thus:—First make a section of the cornea with a Graefe's cataract knife or a broad keratome, then tear open the pupil and through the capsule of lens with a cystotome, or if this be insufficient, remove a portion of iris and the adherent lens-capsule with a pair of iris scissors, and, lastly, with a little pressure on the globe with the back of the curette cause the escape of the lens through the corneal wound. This operation may generally be accomplished without the loss of any vitreous, and the eye will usually recover from its effects well, but the pupil will probably again become closed. Another operation will afterwards be required for the formation of a new pupil.

The third stage of the disease is characterised by increased tension of the globe, and this condition is generally associated with pain, oftentimes very severe, and sufficient to make the patient willing to submit to any means suggested for his relief. This state of tension lasts a variable period, but, as a rule, it ultimately subsides, and the eye softens. If the state of tension be long continued the little sight that is left soon vanishes. When the eye has reached this stage of increased tension active treatment is necessary. An attempt to do an iridectomy I have always found unsuccessful. The iris is adherent throughout its posterior surface to the lens-capsule, and is either so rotten that the forceps pass through it, and cannot seize a piece to draw it out, or else the iris has become tough and fibrous, and simply tears like calico under the grip of the forceps, and no portion of it can be satisfactorily removed. During the last eight months I have performed the operation of sclerotomy in these cases, and have been pleased with the result. The knife has

been made to pierce the sclerotic just external to the corneo-sclerotic junction, rather higher than the point selected for a Graefe's extraction of cataract, and carried in front of the iris; the counter-puncture has been made at a corresponding point on the opposite side. After slight cutting, so as to make the section a little broader than the breadth of the blade, the knife has been withdrawn, leaving a wide bridge between the sections.

In each instance the pain has been relieved immediately, and in two, in which there were ciliary staphylomata, the bulgings subsided, and the eyes became soft. In one patient in whom the pain was so excessive, that morphia had to be injected subcutaneously twice a day, the relief was so rapid that after the operation the patient slept without the morphia injections, which were not again required. In this case the sight also was improved. Before the operation the man could only just count fingers when held close to the face, and when he left the hospital he could read Jaeger 19 at 2 feet.—*Royal London Ophthalmic Hospital Reports*, *August* 1880, *p.* 1.

55.—ON CENTRAL AMBLYOPIA.

By George W. Berry, Esq., M.B.

That form of amblyopia in which direct vision is impaired alone, whilst that of the peripheral portions of the retinæ is entirely unaffected or but slightly less acute than normal, constitutes a group of cases which claim consideration as well from their relative frequency as from the fact that the prognosis is all but invariably good. They very rarely end in complete blindness, occasionally they remain stationary after more or less loss of direct vision, and, in the great majority of instances, they undergo partial or complete recovery. Their diagnosis is, therefore, a matter of importance, and, I cannot but think that were they always recognised as a distinct class, we should hear less of the wonderful cures produced by strychnia and electricity in amaurosis or optic nerve atrophy.

Cases of central amblyopia present themselves for treatment at Moorfields almost daily. Through the courtesy of the surgeons I have had frequent opportunity of studying them, besides having had my attention drawn to the subject at the clinic of Dr. Edmund Hansen, at Copenhagen, where they have been carefully studied for the last thirteen years, and from whence 183 cases constituted the material for an admirable treatise by Krenchel in 1876. I would, therefore, as briefly as possible, point out what appear to me to be the chief points of importance in the diagnosis and prognosis of this form of amblyopia without giving any cases in detail. Illustrative cases will be found in Mr. Hutchinson's last paper on Tobacco

Amaurosis, and Mr. Nettleship has given very accurate representations of the field of vision with reference to the central colour scotoma to which, so far as I am aware, he was the first to draw attention in this country.

Central amblyopia appears in the great majority of instances to be a toxic affection most commonly caused by the abuse of tobacco. The occasional deleterious effect of tobacco on vision has long been known or rather suspected; it is referred to by Mackenzie in his well-known treatise on the diseases of the eye, and later on in 1863 by Wordsworth, Hart, and Hutchinson. At that time, however, no systematic examination of the field of vision appears to have been generally practised, and consequently no thorough classification of such cases into a distinct group was possible.

The general features of these cases of central amblyopia are probably familiar to most ophthalmic surgeons. A man, generally beyond thirty years of age, complains of gradual failure in the sight of both eyes, accompanied by a disagreeable sensation of fog; usually this has been going on for some months before he applies for advice; he has seen well four or six months ago, but latterly he has not been able to read even large print, and has finally been obliged to give up his occupation. He is often alcoholic, not unfrequently has lost his appetite, or is sleepless, has suffered from diarrhœa, hemorrhage from piles or some other drain on the system, but often he has noticed nothing unusual in his state of health; very frequently indeed he is a great smoker. There are still some ophthalmologists who do not appear to be convinced of the toxic effect of tobacco alone in producing amblyopia, and ascribe the defect of vision more to alcohol, to which they assert patients with so-called tobacco amblyopia are always addicted. But why then should improvement take place so rapidly and so surely in many cases when the supply of tobacco consumed is diminished or altogether stopped? Again, although it must be admitted that it is very rare indeed to find one of these favourable cases of central amblyopia in an individual who smokes immoderately without at the same time being in the habit of occasionally drinking to excess, yet I have seen two typical cases, one an old man, aged 70, who had been a tee-totaller for forty years, and the other a boy of 19 (the youngest patient in whom I have met this form of amblyopia), who certainly did not drink; and similar cases have been met with by others. Some cases, however, appear to be complicated with chronic alcoholic poisoning, and I think as a general rule it will be found that the more complete the alcoholism, the slower and more imperfect is the recovery on the cessation of smoking. Mr. Hutchinson is of opinion that the effect of alcohol is, on

the whole, antagonistic to tobacco, and in this I am inclined to think he is right, judging from personal experience and from the experience of others whom I have questioned on the subject, and who, like myself, are susceptible to the depressing effect of tobacco in any quantity or of more than moderate strength. But we must draw the distinction between alcoholic stimulation and alcoholism, where the vital powers are actually lowered and notoriously unable to withstand any unusual strain. It is just possible then that the toxic effect of tobacco may not assert itself until the antagonistic effect of the alcohol has from over stimulation given place to a certain amount of depression and the equilibrium thus destroyed. This would appear sometimes to explain why a man who has smoked all his life with impunity is all at once affected by tobacco. Although it by no means explains the cause of central amblyopia in all cases, as on the one hand we meet with cases, already referred to, where no alcohol is used, and on the other hand a few cases occur in which the alcohol itself must be looked upon as having a more direct effect on the production of the symptoms. Anyone with any experience of smokers must have been struck by the different degrees in which different men are affected by tobacco, how some never smoke anything but mild tobacco, and seldom, except after meals, whereas others smoke the strongest tobacco at any time of the day. The fact of such idiosyncrasy being a matter of daily experience, is strongly suggestive of most cases of tobacco amblyopia being found amongst the former class. The class of patients who apply at the hospital (and it is in this class that central amblyopia is most frequent), generally smoke shag, and are often obliged to do so on an empty stomach, and although occasionally they confess to have great difficulty in learning to smoke, and being somewhat susceptible to tobacco altogether, still this cannot always be elicited.

The evidences then in favour of tobacco being the agent apart from alcohol in the production of the majority of cases of central amblyopia, are the gradual disappearance of the symptoms on the cessation of smoking without any other treatment being resorted to, and frequently without the supply of alcohol being diminished, and the occasional presence of exactly the same symptoms in individuals who do not use alcohol at all. To these may be added the very suggestive fact of its extreme rarity in women, except in cases where there is distinct palor of the optic disc, and where the subsequent course confirms the diagnosis of progressive atrophy.

The subjects of central amblyopia often seem to suspect that their ailment is due to smoking, and express great willingness to give it up. Frequently, however, their good intentions are left unexecuted.

They invariably complain of great mistiness of vision, which varies considerably at different times, and is almost always said to be less in a dull light; they see "through a fog"; this is entirely confined to the region of the central defect, and we are frequently told that things appear much clearer when seen eccentrically. The improvement in vision in a dull light is probably only relative, that is, the difference between the indistinctness of direct vision and the clearness of indirect vision is not so marked, besides which the pupils are perhaps a little more dilated, although they are often not small even in a bright light. I have at any rate not been able to demonstrate any actual increase in visual acuity in subdued light; on the contrary, I have always found the reverse, and in one case which I examined with Masson's disc, by which means we are able to test the power of distinguishing between shades of grey differing only slightly in intensity, the light-sense was decidedly best when the absolute intensity was considerable (in bright daylight), and diminished in proportion as it decreased. This was tried with and without a stenopaic aperture (2 mm. in diameter). My observations in connection with the light-sense in these cases are, however, too few to enable me as yet to draw any general conclusions, and, indeed, the examination of the light-sense of a definite portion of the retina is a matter of no inconsiderable difficulty. Some interesting experiments on this subject will be found in Krenchel's paper above referred to.

Usually the visual acuity has become very materially diminished before these patients apply for advice (Jaeger, 14 to 20 at 8″), but we meet with all degrees, and it is just in the minor degrees, especially if there be at the same time some complication (as for instance incipient cataract or central choroido-retinitis), that there is any difficulty at all in the diagnosis. The amblyopia is generally much the same in both eyes; when there is any considerable difference, I have, as a rule, found it to be in the higher degrees. If the acuity be as low as J. 19 or 20, it will often be found that the eccentric vision is better than the direct, and it is important to bear this in mind, otherwise an improvement may often be assumed when, in reality, the patient has only discovered how to supply the defect of his central vision by making use of the peripheral portions of the retina. Besides, according to Graefe, when the direct vision has become very defective, an improvement in acuity amounting to double or even treble the original amount often takes place in that of the peripheral portions of the retina immediately surrounding the defective area.

The scotoma occupying the centre of the field of vision cannot easily be demonstrated in the ordinary way until the acute-

ness of vision is so blunted that the patient cannot make out J. 16, then it is found that within an oval area stretching from the papilla to slightly beyond the macula lutea, a white object, especially if the examination be made in subdued light, does not appear so distinct as when seen by its neighbouring parts of the retina. The long axis of the oval scotoma is horizontal, and its point of greatest saturation somewhere between the nerve and centre. Sometimes indeed it may extend further horizontally, more of the nasal part of the field being involved. In all cases, except those in which the central scotoma is the first subjected manifestation of a progressive atrophy, the periphery of the field of vision remains intact, even although the central vision should sink so low as only to be capable of distinguishing light from darkness. The peripheral colour sense is also retained as a rule, although in some severe cases it is defective; but it is never so completely abnormal as in the region of the scotoma. Generally, it appears to be the nasal portion of the field where the perception of green and red hues is deficient, whilst immediately above and below the scotoma it remains normally acute. Leber and Nettleship have described cases in which the peripheral colour defect has taken the form of a ring-shaped scotoma.

In the less severe cases the examination of the colour-sense affords an easier and more trustworthy test of the presence of a scotoma. Within the abnormal area there is more or less red-green blindness. Therefore, all that is necessary practically in order to determine the existence of a central scotoma to account for a certain amount of amblyopia, is to find out whether a red or a green hue is seen more distinctly outside than within the bounds of an oval area occupying the position indicated above. This is simple enough, and yet it requires some care and practice, especially if the amblyopia be slight and the patient inattentive or stupid. Each eye should be examined separately. A small piece of red paper not larger than 10 mm. square should be used. This, if held at the end of a piece of whalebone, can be brought opposite any portion of the retina whilst the patient is steadily fixing some definite object large enough and bright enough to be easily seen. If the case be pronounced, the red will appear bluish, yellowish, buff, brown, white, or of an indefinite dirty colour, according to the hue and shade taken, and the part of the scotoma on which it falls. Small green objects will give rise to much the same sensations, but it is not necessary to use more than one colour, and different hues of red are, perhaps, more easily obtainable. The colours appear brighter in shade at the very centre than between it and the blind spot, where they are often described as dirty or smudgy, and it is in this latter region that the first evidence or

last traces of a colour-scotoma can be detected, and indeed the macula does not always appear to be involved. If the amblyopia be less pronounced, we should often fail to detect the scotoma if we were merely to rely upon the naming of the coloured object by the patient, he might call it red or green whenever it chanced to fall on the retina. In such cases it is well to use two different reds, one of a somewhat bluish and the other of a somewhat yellowish hue. By bringing these alternately 8° or 9° on either side of the point of fixation, as recommended by Krenchel, it will often be found that the red appears more distinct to the nasal side, being more paler, bluish, or more yellowish-red to the temporal side. Another plan which I frequently adopt, and which is still more delicate, is to use different shades of the same red by mixing with white; the palest is then a faint pink, and with these and an average amount of intelligence on the part of the patient, the very smallest defect can readily be detected.

The scotoma is entirely negative; thus the patient on looking at a large uniformly red surface, as he recognises the colour from the impressions received by the normal portions of his retina, believes he sees it red throughout, and is entirely unconscious of the altered impression caused by the scotoma in the same way as we are unaware of the want of continuity existing in our field of vision over the surface occupied by the entrance of the optic nerve. For this reason, and owing to the circumstance that the colour-sense defect in the scotoma is of the same nature as in congenital colour blindness, so far at least as there is no blindness for one colour hue without at the same time a corresponding blindness for its complement, it is possible to choose two or more colours which give the same sensation at some particular point in the scotoma. And if one of these colours be given to a surface occupying a large portion of the field, whilst only a small portion of the surface opposite this particular point in the scotoma is of one of the other colours, the impression received is the same as if the whole surface were of uniform colour. By taking advantage of this, we have another good practical way of demonstrating the existence of a colour defect which involves direct vision, namely, by the use of Pflüger's colour tests, which are based on the principle of spontaneous contrast. Thus, in five cases in which the amblyopia was not excessive, I have found that none of the letters on the second sheet (red) could be made out when covered with one layer of tissue paper; the sheet appeared of a faint uniform colour, like pink blotting-paper. When, however, the attention of these patients was called to the presence of letters on the paper before them, especially after they had seen those induced from the yellow and blue and from most of the greens, there

appeared to be a very faint induction from the peripheral parts of the retinæ, though not sufficiently distinct to enable them to read the letters eccentrically.

As to the ophthalmoscopic appearances, I think a little too much has been made of the paleness of the temporal half of the disc. This is by no means a constant symptom, nor does it appear to stand in any relation to the duration of the amblyopia. I have recently seen a case which had lasted two and a-half years, in which the discs presented a perfectly normal appearance both in respect to transparency and colour; a certain amount of pallor is certainly frequently met with in these cases, but as much is often found without any subjective symptoms whatever, and falls quite within the bounds of physiological variation. Further, it is a well-known fact that any paleness of the discs is always most marked on the temporal side. A shallow and broad physiological cup, by no means uncommon, gives a whitish aspect to this part of the disc, and in the case where the contrast between the two halves is marked, such a condition may coexist with a slight pallor associated with the amblyopia. At any rate this appearance is in no degree inconsistent with perfect recovery, so that we cannot ascribe to it any importance in the prognosis. Of more importance, however, is an appearance occasionally met with of a sort of insidious neuritis, a local perivascularitis associated with loss of transparency and haziness of the disc; white streaks accompanying some of the vessels just as they emerge from the nerve, and not extending much, if at all, beyond the margin of the disc, sometimes they seem to bridge over the space from one vessel to another: in short, they are the evident signs of inflammatory change. This condition is only found in the severer cases. In the great majority of cases there is absolutely no pathological change to be found with the ophthalmoscope.

In the diagnosis of central amblyopia, the presence or absence of the colour scotoma is of primary importance, should the defect of vision be slight, or any detectable complication coexist either on the part of the dioptric media, retina, or choroid. But as a general rule, the symptoms are so evident, that this test is unnecessary to establish the diagnosis; still it is well to make it a matter of routine, and with very little practice this can be done without loss of time.

The prognosis is always good as far as complete blindness goes, except in the rare cases before referred to, where progressive atrophy begins by manifesting itself as a central scotoma.

The treatment consists in withholding tobacco and diminishing if necessary the amount of alcohol consumed. This must be insisted upon. The patients will probably also require some "mixture" to which to ascribe their cure, the nature of which

may be left to the discretion of the surgeon; few drugs of the Pharmacopœia will do harm. — *Royal London Ophthalmic Hospital Reports, August* 1880, *p.* 45.

56.—ON OPHTHALMIA NEONATORUM—PURULENT CONJUNCTIVITIS—GONORRHŒAL OPHTHALMIA.

By Dr. J. R. Wolfe, F.R.C.S.E., Lecturer on Ophthalmic Medicine and Surgery in Anderson's College, Glasgow.

About twelve years ago, I stated that, from the examination of the inmates of the Asylum for the Blind in Aberdeen and elsewhere, I found that the largest number of the incurable blind owed their misfortunes to purulent opthalmia of infancy—a disease almost invariably destructive in its tendency when unchecked, but which is under the control of proper treatment. I urged upon medical practitioners the importance of abandoning the treatment then in vogue; but I regret to find that the old routine practice is even now pretty generally pursued.

On the third or fourth day after birth your attention is called to baby's eyes. You find the lashes stick together; hard crusts form at the borders, which are red. First one eye is attacked, then the other also. You suspend your judgment with regard to the nature of the disease, for it may be only a catarrhal attack, which will pass off in a few days, or it may be the beginning of diphtheritis.

The next day you find the redness and swelling increasing, the lids more swollen, and the conjunctival sac filled with transparent, yellowish-coloured serum and mucus; then you have no doubt that you have to deal with a most dangerous and destructive form of conjunctivitis. The swelling and redness go on increasing, and on lifting the eyelids some drops of pus come out. In about a week the swelling of the conjunctiva and the engorgement of the vessels increase, and there is a copious discharge of pus, which runs over the cheeks of the infant. The swelling of the palpebral conjunctiva and of that of the *cul-de-sac* becomes tense on the eyeball, so that there is a difficulty in opening the lids, and when opened the cornea is hid and retracted in the purulent discharge.

Cause.—What has taken place is this. The child in its passage from the uterus had its eyes inoculated, most likely with gonorrhœal, possibly with leucorrhœal, or other discharge from its mother's genital organs. You know when a mucous surface, with lamellated epithelium, like the urethra or conjunctiva, is inoculated with pus, a process of proliferation of the epithelium ensues. The epithelium is transformed into pus-cells, which are thrown off, and it is rapidly reproduced, to be again turned into pus. Or, to use the words of the eminent

author of this doctrine, "The real state of matters is exactly the reverse of what it was previously imagined to be, when a solvent property was ascribed to pus. Pus is not the dissolving but the dissolved, *i.e.*, the transformed tissue. A part becomes soft and liquefies whilst suppurating; but it is not the pus which occasions this softening—on the contrary, it is the pus which is produced as the result of the proliferation of the tissue." This is effected without the slightest ulceration of the surface, on account of the several strata of cells, the upper forming a kind of protection to the deeper ones.

This suppuration may go on for two or three weeks, until the reproduction of the epithelium cannot keep pace any longer with the pus-formation; then the covering becomes imperfect, the conjunctiva and sub-conjunctival tissues are attacked at the limbus, ulceration or abscess of the cornea ensues, ending in perforation, the eyeball bursts, the lens is evacuated, and the ball shrinks. This is particularly the case when the lids become tense upon the ball, impeding the circulation.

Should the eye escape disorganisation in some of the milder attacks, opacity of the cornea is left behind, causing strabismus, amblyopia, nystagmus, or opacity of the lens-capsule (capsular cataract).

Treatment.—Our endeavour must be directed to prevent the cornea from being involved in the morbid process.

The deleterious treatment above referred to consists in dropping a solution of argent. nitrate (grs. x. to ℥j.) into the eye. The effect is, either that the pus washes away the solution, rendering it innocuous (for it never touches the diseased surface), or it irritates the cornea, denuding it of its protecting epithelium; the cornea ulcerates, or an abscess is formed, leading to disorganisation just referred to. During this period the swelling of the eyelids increases to such an extent that an examination of the ball is impracticable; and when the swelling abates, and the surgeon is able to see the ball, he finds that the eye is gone. Or to use the pithy history which mothers give of the case—"The eyes were so swollen that the doctor could not get a glimpse of them; and when the swelling fell, and it opened its eyes, we found that there were no eyes at all."

Argent. nitrate is a valuable remedy, but a two-edged sword. I am so strongly impressed with the havoc which it does to infants' eyes, that I very rarely used the solution in my clinique, for fear lest some of you should carry a vague notion of its application, and be the means of doing mischief.

The course which we adopt is:—

1. When I happen to see the case in the first stage, before the purulent discharge has set in, I make the patient's head recline upon my lap upon a towel, where it is secured. I evert

the lids, either both together, or first the upper and then the lower, and after cleaning them with dry lint, I touch the conjunctival surface with lint dipped in a solution of ℞. Boracis grs. x., aq. rosæ ℥j., aquæ ad ℥vj.; one dessert-spoonful in ℥ij. of warm water. I then put a few drops of the solution of atropine upon the conjunctival surface. ℞. Atropiæ sulph. gr. j., aquæ ℥ ij., glycerini ℥ ss.; a few drops. The application is repeated three times a day. The atropine has an antiphlogistic effect upon the inflamed surface, and also by dilating the pupil relieves the tension of the eyeball. I never use cold applications, which are recommended by eminent authorities, neither do I employ ointments of any kind to keep the lashes from sticking together. This I think is best effected by washing with warm water. Dry lint is then applied to the lids, and secured by an immovable bandage. I watch the case carefully.

2. When I see that it is an unmistakable case of purulent ophthalmia, I proceed to the following course:—The patient's head being put upon my lap, I evert the upper eyelid, then the lower, and having cleaned away the pus by means of dry lint, I drop in a little of the solution of atropine, then I touch the surfaces with an amalgam consisting of argent. nit. two parts, and potass. nit. one part, and again put a few drops of atropine upon the cauterised surface.

When the conjunctival surface is bleeding (which I regard rather as a favourable symptom), I dry it with lint, and repeat the cauterisation. I touch the whole of the conjunctiva and also the *cul-de-sac*. I bathe it with lint dipped in warm water, and cover the eyes with dry lint and a bandage. When one eye is affected, I close the healthy eye with two strips of court plaster, and cover it with lint.

3. When you are called to see a case in an advanced state of suppuration—say of three or four weeks' standing—then you must take care in opening the eyelids, for the eyeball may be just on the point of bursting, and the effort to lift the lids, and the spasm of the orbicularis, may be the means of hastening on the inevitable, for which you will get the entire credit. You had better open it by means of the elevators, with which you raise both eyelids—or, if you have only one instrument, the upper one—without pressing upon the globe. I must, however, give you a caution on the subject of instruments. The great majority of people that we have to deal with, especially in the country, entertain a large amount of ignorant prejudice against their use, and are sure to ascribe to them any unfortunate termination of the case. On one occasion, when I had to use the elevators in a case in the country, the mother rushed from the room, crying that I was turning the child's eye inside out!

If you find the cornea intact, use the atropine and nitrate pencil. Touch the conjunctiva very gently, just passing lightly over the epithelial surface, not to dig into it, otherwise you will produce an eschar or loss of substance, and a cicatrix, which it is your object to avoid.

4. When an ulcer of the cornea or an abscess has already formed, or even when all the layers of a portion of the cornea are destroyed, with the exception of the Descemet membrane, which protrudes through the ulcer in the form of a corneal vesicle (keratocel), and is the only bar to the exit of the aqueous humour, then it becomes more urgent to proceed energetically with the application of the nitrate. It is the only weapon to combat this disease. We generally manage to arrest its progress and save the cornea, even if we have found it in the process of softening or with abscess.

In May 1880, I was asked by Dr. S. to see a patient of his, an infant four weeks old, which in his absence was treated by somebody who delivered the mother. I found the left eye totally destroyed, and the right with a purulent discharge and abscess at the lower corneal segment. I adopted the course of treatment just indicated, visiting the child daily. After a week's treatment we thought we might see the patient at longer intervals, and were disagreeably surprised to find that there was a relapse. The discharge recommenced. I had therefore to resume assiduous attention, and we are pleased to find that even at that critical juncture we have saved at least one useful eye to the infant.

Such cases you must see daily. In public hospitals or dispensaries, Sundays must not be excepted, for one day's neglect may prove disastrous.

Modus Operandi.—The old method of applying the caustic solution was based upon the conception that we substitute a new kind of inflammation to drive away the old one. Homœopathy has not been slow in deriving from it the justification of its "*similia similibus*" dogma. But it is not the principle on which we act. What we actually do is, we produce a fine coating of the nitrate upon the superficial epithelial layers in order to give the new layer time to be formed, under cover as it were, without being exposed to pus metamorphosis. I told you that the cause is inoculation. It is, however, the opinion of some eminent authorities, especially among French surgeons, that it sometimes prevails epidemically, and hence it must have an atmospheric origin. McKenzie thought that the practice of washing the infant's head with soap-and-water, or with whisky, or the exposure to a bright fire at birth, might induce suppuration.

Without expressing an opinion as to whether soap or whisky

may produce pus-cells, I merely mention the fact that these are the views of some writers.

Inoculation from Ulcers or other Discharges.—There can be no doubt, however, that purulent conjunctivitis may be produced by inoculation from other discharges. I was asked by the late Dr. D. to see his grandchild, a girl of three years of age, who was troubled with a serious inflammation of the right eye for four or five days. I found the conjunctival sac filled with a yellowish ichory discharge—not like the creamy discharge in infantile ophthalmia. I had no doubt that it was a case of inoculation. On inquiry I found that the nurse was suffering from ozæna, and bloody pus from her throat or nostrils was found upon the pillow. The smell was so offensive that every morning the window had to be opened before the lady could enter the nursery. As the child was the nurse's bed-companion, there could be no doubt how the disease originated. The case did well, without leaving any trace behind after ten days' treatment.

Gonorrhœal Ophthalmia.—Persons suffering from gonorrhœa sometimes inoculate their conjunctiva by touching it with their fingers or with a dirty towel used in dressing, by themselves or by a fellow-lodger who has a running. Most frequently the right eye is affected. Women are rarely subject to it.

Treatment must be very prompt. Warm fomentations should be used, and a weak solution of caustic (nitrate argent. gr. v. to aquæ ℥j.) painted with a camel-hair pencil over the palpebral conjunctiva, and washed off with another pencil dipped in a solution of chloride of sodium.

When the discharge gets more abundant, we must have recourse to the same treatment as in infantile ophthalmia. Some of our most eminent authorities, as my excellent teacher M. Desmarres and Von Graefe, both recommend twenty or thirty leeches to the inner angle of the eye and temple, and friction with unguent. hydr. fort. et belladonnæ over the eyebrows. I have no objection to the unguent., followed up with small doses of blue pill with quin. (pil. hydrarg. gr. xxx., quin. sulph. gr. xx., divid. in pil. xx.), one three times a day. But I must confess that the leech has only a zoological interest for me; I could never see its applicability to eye affections. Rest to the eye and body is absolutely necessary.

I need hardly remind you that the prognosis is more serious when the urethral discharge is complicated with chancre or gleet. In that case, indeed, you will find, after five or six days, that the limbus has the appearance of constriction, as if a cord were drawn round it; the aqueous chamber becomes narrower, and presents a peculiar glassy look, and then collapses. No course of treatment can save the eye from disorganisation.—*Medical Times and Gazette, Sept.* 4, 1880, *p.* 259.

7.—A NEW TREATMENT OF GONORRHŒAL OPHTHALMIA.

By C. Bader, Esq., Ophthalmic Surgeon to Guy's Hospital.

Gonorrhœal ophthalmia, at all stages, is to the oculist a source of great anxiety. Whether local treatment—ice, bleeding, scarifying, caustics (all painful and often more than useless)—or general medical treatment (mercury, &c.), be employed, we meet cases, even if treatment be begun at an early stage, in which the sight of one or both eyes is lost.

The treatment adopted in the following cases suggested itself by the fact that mercury, if thoroughly applied locally, has a destructive effect upon contagion. In vaseline, in itself of antiseptic origin, we have an invaluable means of bringing and keeping mercury in contact with mucous membranes, such as conjunctiva, urethra, &c.; daturin or atropin are added to counteract disturbances which, during the ophthalmia, may proceed from the iris and deeper parts of the eye. An ointment was employed, consisting of nitric oxide of mercury one grain, daturin one-fifth of a grain, vaseline one ounce.

Case 1.—J. R., aged seventeen (January 21, 1879), suffers from gonorrhœa, ninth day. When seeing the patient with Dr. Wooley of Dalston, he presented all the symptoms of gonorrhœal ophthalmia in its acute stage. Eyelids of right eye blue, red, swollen, and so tense that only the lower third of the cornea could be seen; it was yellow and opaque; there was profuse purulent discharge. The left eye was healthy.

I considered the eye nearly lost, and felt justified, instead of the usual treatment, to try the effect of an ointment made of daturin and nitric oxide of mercury, of each one-fifth of a grain, vaseline one ounce.

I thoroughly washed away the discharge with tepid water, then with a large camel's hair brush freely, though with difficulty, pushed the ointment beneath the upper eyelid of the right eye; this caused no pain whatever. Both eyes were then bound up with lint thickly smeared over with the ointment. The attendant was informed of the dangerous nature of the discharge, and was told to wash it away every third hour, and to apply fresh lint spread over with ointment to the eyelids of the inflamed eye.

For four succeeding days I applied the ointment myself beneath the right upper eyelid. On the third day the patient became slightly delirious, probably from the effect of the daturin. The mercury was increased to one grain, the daturin remaining one-fifth of a grain.

On Jan. 30 I received the following from Dr. Wooley:—"The eye is very much less swollen to-day, but he has complained of severe pain. The delirium, which he was suffering from, has not returned, and he has made good progress."

Feb. 1. Much better; ointment applied beneath the upper eyelid as before; fresh lint used once daily only; pus washed away repeatedly during the day; cornea visible throughout lower third, still opaque but not ulcerating.

3. Eyelids again swollen with much pus. From this day rapid progress was made. As soon as the eyelids opened freely, the application of the ointment with the brush was discontinued, and only lint and ointment applied every morning to both eyes. The left eye kept free from inflammation throughout.

March 5. Both corneæ clear; eyelids open freely.

I saw the patient once during the summer. He was completely cured; both corneæ clear.

Case 2.—W. W., aged three years and half (Nov. 6, 1879), was sent to me by Dr. Ward of Finsbury Circus. The father of the boy, on inquiry, stated that the boy had slept with a servant who suffered from gonorrhœa. To admit of the treatment being carried out carefully, the boy was taken into the Eye ward, Guy's Hospital. On admission the left eye was sound, the right suffered from acute gonorrhœal ophthalmia (eyelids red, tense, swollen; much chemosis, with conjunctiva protruding, profuse purulent discharge). On examination under chloroform only the lower third of the cornea could be seen; it was clear, with the surface softening along the margin. Portions of the conjunctiva of the lower eyelid were covered with a grey opaque substance, as seen in mixed cases of diphtheritic and purulent ophthalmia.

The pus was thoroughly washed away with tepid water. The ointment, with a large camel's hair brush, was well pushed between the upper lid and the eyeball, and thickly applied to the conjunctiva. Both eyes were kept bound up with lint thickly spread over with the ointment. Fresh lint was applied every morning. Every third hour during the day the discharge was washed away with tepid water (the left eye being bound up), and the ointment pushed beneath the upper eyelid. This caused no pain, and the boy bore it quietly. On the third day the grey covering had disappeared from the conjunctiva.

On Nov. 13 the application of the ointment beneath the upper lid was discontinued; the lint was changed every morning, and the lids cleansed with tepid water.

Nov. 17. The eyelids open well; the conjunctiva is still congested; the cornea smooth and clear.

28. Discharged cured.

Case 3.—B. E., aged seventeen, was admitted into the Eye ward on Jan. 13, 1880. His medical man states, "The youth came to me ten days ago with the eye much in the same condi-

tion as it is now. He had a week's treatment with tonics and the daily dropping of nitrate of silver solution (one grain to an ounce). The boy suffers from gleet." The right eye was healthy. In the left cornea, near the outer margin, was a deep large ulcer near perforation; the adjoining cornea was infiltrated with pus; there is iritis, chemosis, swelling of eyelids, and slight purulent discharge.

The ointment (atropin being substituted for daturin) was applied beneath both upper eyelids, and both were kept bound up with lint smeared over with ointment. This was repeated daily.

Feb. 3. Much improved.

10. The patient was discharged. Right eye sound; left eye, surface of cornea smooth, outer third opaque, pupil somewhat irregular, fairly dilated. Was told to wear a shade, and to apply the ointment to the inner surface of the under lid at eight, two, and five o'clock.

Case 4.—E. T., aged twenty-six (Feb. 12, 1800), was admitted with purulent ophthalmia of both eyes. Left cornea, small opacity near outer margin; right cornea, two opacities. Some iritis. Much chemosis and swollen eyelids, with moderate purulent discharge. The ointment was applied beneath the eyelids at eight, two, and five o'clock daily, and the eye kept bound up with lint and ointment. No pain whatever on application of the ointment.

Feb. 20. Patient was discharged with dilated pupils; smooth cornea, slightly opaque. All swelling of eyelids and conjunctiva had disappeared. She was told to wear a shade, and to apply the ointment to the inside of the under lids at eight, two, and five o'clock.

Case 5.—B. S., aged four (Feb. 20, 1880); badly fed; has had whooping-cough for the last two months; cannot be admitted into the Eye ward. Both eyes are affected; the eyelids swollen, purple, tense, can hardly be raised. Conjunctiva highly chemotic. Both corneæ transparent, peeling along the margin. The ointment (nitric oxide of mercury and atropia of each one-fifth of a grain, vaseline one ounce) was, under chloroform, freely pushed between the upper lids and the eyeballs; both were bound up with lint smeared over with ointment.

Feb. 24. Judging from the size of the pupils, the mother, though shown how to apply the ointment must have done so very imperfectly. The ointment, under chloroform, was again applied as above.

27. Same application under chloroform. All swelling of eyelids and conjunctiva has subsided. Corneæ clear and smooth.—*Lancet, May* 1, 1880, *p.* 675.

58.—ON A NEW METHOD OF TREATMENT OF RELAXATION OF THE MEMBRANA TYMPANI.

By Dr. William A. M'Keown, Surgeon to the Ulster Eye, Ear, and Throat Hospital, Belfast.

When a claim is advanced for the introduction of a new method and a new principle in the treatment of disease, it is desirable to review the present state of knowledge. On examination of the works of the most eminent authorities in aural science we shall find that—

No method of Treatment of any value has been proposed or practised for Relaxed Membrane.—Sir William Wilde, in his classical work on "Aural Surgery," writes:—"This is a cause of deafness most difficult to treat, but unless some other disease co-exist with it we may generally assure the patient that his deafness will not increase. When once the membrane has been pressed for any length of time inwards it is very difficult to restore its position permanently. Many persons inflate the drum by holding the nose and making a forced expiration whenever they wish to hear what is said. In others we can temporarily restore the position by Eustachian catheterism, but in both the membrane returns to its former condition in a short time. I have tried the effect of exhausting the air in the external meatus by means of a syringe accurately adjusted to the outer aperture, but I have not effected any good thereby. On the contrary, I think the congestion produced by the exhaustion is rather detrimental to the organ. I have frequently afforded temporary relief by dropping with a glass tube a little nitrous ether into the meatus, and immediately stopping the external aperture either with the finger or by pressing the tragus over it. Some slight pain is instantaneously felt, followed by a boiling sensation, then a glow of heat, and a feeling, to use the patient's expression, as 'if the drum of the ear was sucked out.' It is difficult to understand how this remedy acts and assists to restore the membrane to its normal position."

Hinton, in his work on the "Questions of Aural Surgery," says:—"In milder degrees of indrawing of the membrane, when, though it can be restored to its place by inflation, and temporary improvement follows, it soon falls back again, Politzer introduced and still speaks highly of the plan of keeping up an air-tight closure of the meatus. Having well inflated the tympanum, he takes some cotton wool rolled up into a small ball with wax or ointment, and with it closes the orifice of the meatus. He thus takes off the pressure of the external air, and even turns to account the absorption of air in the meatus, making it tend to draw the membrane outwards, care being always taken to see that the Eustachian tube is free. The ball

may be worn for several consecutive nights, and then omitted for the time. When the membrane is atrophied, however, this plan does not succeed. But then excision of the relaxed part, whether it be a scar or a part otherwise thinned, will sometimes be of use; or if the relaxation has advanced only to a less degree, and the membrane simply lacks the proper tension, simple incisions into the most relaxed part of the membrane help towards a restoration of the normal tension, apparently through the contraction that attends their healing. The incisions may be frequently repeated, and at short intervals; but in this climate, and with the kind of patients we usually see, I should prefer always to let fourteen days elapse." It will be observed how unsatisfactory is the testimony of this conscientious observer regarding the treatment he proposes. It looks as if he thought these means should be useful rather than that they were. He says nothing of his personal experience of Politzer's method. To cut out a piece of the membrane is not an operation easy of execution nor altogether safe, and simple incision is, in my opinion, very unlikely to increase the tension. Certainly he has not advocated these operative measures in such a way as to lead to their adoption, and we have no data on which to form an independent judgment.

Toynbee deals with the subject, and gives details of cases in which he treated intercurrent inflammatory attacks with success, but we have not a suggestion regarding the treatment of the condition of relaxation.

I need not further quote from authorities. I may briefly state that the works of Von Troeltsch, St. John Roosa, Turnbull, Dalby, Field, and Macnaughton Jones, either pass over the subject altogether or fail to make any valuable suggestion for treatment.

Importance of the proper tension of the Membrane.—There can, I think, be no question that the membrane has at least two functions—viz., to receive vibrations for conveyance through the ossicles to the labyrinth, and to support the handle of the malleus. If the membrane in whole or in part have lost its proper tension, it is, I think, evident that the vibrations will not be conveyed with due regularity, that different vibrations succeeding each other may be confounded, and that a dulness of hearing may result from the confusion necessarily resulting. Further, if the membrane at parts be depressed so as to touch structures within the tympanic cavity, the force of the vibrations may be diverted from its proper channel. It is likewise evident that one part of the membrane may be depressed without materially interfering with the support of the handle. If the membrane be of proper tension in two or three different radial directions, the handle may be well supported, and the hearing

consequently will not suffer from this cause. If, on the contrary, the whole of the anterior or posterior segment should be defective in tension, then the handle can have no longer proper support, and is likely in time to assume a faulty position, as a rule, in a direction opposite to that in which the tension is defective. When the whole membrane lacks proper tension, then the handle usually inclines inwards too much, and brings about intra-labyrinthine pressure and nervous disturbance. In some instances the handle as well as the membrane has far too great a range of motion both inwards and outwards—this being no doubt caused by insufflation and forced expiration.

Having now a notion of the functions of the membrane, we may examine with advantage—

The Clinical Characters of Relaxation of the Membrane.—I do not deem it necessary to enter upon a discussion of various diseases which may lead to this diseased condition, but shall simply observe that relaxation is usually brought about either by inflammatory processes in the membrane itself, leading to a loss of resisting power, or by long-continued pressure of the atmosphere on a drum-head exhausted during the course of Eustachian disease. Let us suppose, however, that the original cause has disappeared, and that we have simply to remedy results. The clinical characters are very characteristic, and somewhat varied. As you would expect from the unsteady condition of the membrane, the hearing power varies quickly and remarkably. At one minute the hearing of the patient may be average, at the next quite dull. The fact is, it could scarcely be otherwise, considering that in many cases the membrane flaps in and out in a most irregular manner on every act of swallowing—indeed almost with every change of position of the head. The patient usually has either been taught, or has found out, that distension of the tympanum by forced expiration—the nose and mouth being closed – improves the hearing for the time, and he therefore resorts to this very frequently for the sake of the temporary improvement induced, but so soon as the membrane collapses he is as bad as before. Various unpleasant subjective sensations find a ready explanation from the condition of the membrane. For example, the feeling as if the ears were plugged with wax, or some foreign substance is caused by the inward pressure of the collapsed membrane on the ossicles. The confusion of voices, of which many complain, arises, in all probability, from the vibrations not being quickly conveyed and terminated, because of the want of tension of the membrane. The sensations of opening and closing, or of something falling in the ear, are very frequently experienced by the patients, and are clearly produced by an actual physical cause—viz., the movements of the membrane. Some extraordinary

noises, of which patients with this disease sometimes complain, may be located in the membrane and cavity of the tympanum, and entirely removed from the objectionable category of nervous disease. It does not require a great stretch of imagination to conceive how rattling, thundering, creaking noises arise from movements of the membrane and ossicles. A patient under my care at present says that he had a feeling as if something were knocking about in his ear when he breathed deeply, blew his nose, or shook his head. Clearly the cause was in the middle ear, and, I have little doubt, was caused by a relaxed membrane, with probably some loosening of the connections of the ossicula. This view is borne out by the fact that the symptom disappeared on the restoration of proper tension to the membrane.

On inspection of the membrane we find the greatest variety in the appearances. Sometimes the membrane retains its normal transparency; sometimes it is opaque or somewhat thickened, in whole or in part; the membrane may be relaxed, in whole or in part; the depressed part may gradually slope into neighbouring parts, or may be separated from them by a well-defined margin. In some cases the depressed part is involuted, as it were, so as to be in part hidden beneath the surrounding membrane; or may be so pressed down upon the ossicles that the latter are clothed with the membrane.

To complete the examination of the condition of the membrane, it is necessary to inflate the drum by one of the usual methods. In this way we may determine whether the case is one simply of relaxed membrane, or of relaxed membrane complicated with adhesions. If forcible expiration causes all the depressed parts to bulge, then it is clear the membrane is not adherent; but if by this method no change, or only slight change, is induced, then it will be necessary to use Politzer's method. I have several times remarked that forcible expiration only partially elevated a depressed membrane, and that Politzer's method completed the elevation.

It is especially important to note the relation of the handle of the malleus—viz., whether it is inclined too much inwards or outwards, backwards or forwards; whether it stands out prominently, with membrane depressed before and behind, or has given way entirely to the in-pressing membrane. In the majority of cases deviation in one or other direction will be found.

Prognosis hitherto.—At the best, as Sir William Wilde has remarked, the condition may remain stationary, but too frequently matters take an unfavourable course. The unsteady condition of the membrane, and the consequent varying degree of in-pushing, are sources of irritation, lead to vascular and

nervous disturbance, and often bring about intercurrent congestive attacks. Besides, a non-adherent relaxed membrane may become adherent, and then the case becomes greatly aggravated. The very treatment recommended by some aurists—and frequently practised by patients to secure temporary relief—only tends to augment the loss of tension; I mean Valsalva and Politzer's methods of inflation. Distensile force frequently applied to a structure already deficient in resistance will generally still further diminish its power of resistance. But insufflation, though clearly injurious in the long run, may be required to prevent the immediate occurrence of a greater evil—viz., adhesions during an inflammatory attack. As regards distension of the tympanum, we may say that its practice may do harm, and that its omission may do still greater.

To restore Lost Tension is the Rational Treatment of Relaxed Membrane.—I trust I have now brought you with me to the point of concluding that to restore tension should be our great aim in the treatment of relaxed membrane. That this can be done now with great ease and safety admits of no doubt. At the meeting of the British Medical Association referred to, I showed that contractile collodion applied on the membrane of the tympanum adhered firmly, contracted the membrane to a greater or less extent, whilst it remained adherent, and also exerted a permanently beneficial influence on the relaxation. I am happy now to report that my anticipations regarding the permanent restoration of tension—that is to say, the cure of the condition of relaxation—have been realised.

History of the first case cured by the application of Collodion.—The patient was an unmarried woman, aged forty-one. She had been under my care from time to time for three years on account of catarrh of the drum and its results, and treated by me according to recognised methods. With the left ear she heard my voice (moderate tone) at a distance of three feet, but the hearing varied much. The noises in her ears were of the most distressing kind. At times the noise was like that of a thunderstorm, again like that of machinery, and sometimes like the blowing of a horn. The sounds of other persons' voices were greatly confused ("entangled," as she put it). Her own voice seemed to her to have a most unnatural tone. She formerly sang in church, but since she became deaf her own voice seemed to her so inharmonious that she was obliged to cease singing. At times she was quite bewildered, and she told me that she believed her noises would have put her mad, had she not been obliged to earn her bread. On examination of the membrane, I found a number of depressions between the upper part of the handle of the malleus and the posterior wall of the meatus. All these depressions became bulgings on

inflation of the drum by Valsalva's method. I applied collodion freely. Her hearing was immediately improved, and continued steady. She came to hear my voice (moderate tone) at the distance of eighteen feet, and the noises in the ear ceased. The confusion of voices, and the unnatural character of her own voice, disappeared. She became able to sing as she had formerly done. The depressed part became quite flat. On July 29 (that is, about three months after the application) I thought the layer of collodion loose. I syringed, and found that the loosening was only partial, and that the layer did not come away at all readily. The hearing remained good and the depression had disappeared, probably owing to the long-continued bracing up. The membrane seemed too lax, however, and I put on another coat two days afterwards.

At present the hearing is stationary, the relaxed part has its normal tension, there is not the slightest depression at any part, the membrane has become perhaps more than usually transparent, and the patient has not had a single unpleasant noise since my first application. Two applications have sufficed to bring about a permanent cure of the relaxation. No other treatment of any kind has been adopted.

Critical examination of the history of the above case.—But it may be asked was the improvement really owing to the contractile influence of collodion or to some other cause, or to several causes combined? Was the good result a mere coincidence? We know that deaf patients are usually influenced beneficially by a very dry atmosphere, injuriously by a damp one—beneficially by heat, injuriously by cold. The patency of the Eustachian tube improves the hearing, and obstruction diminishes it. Now, I desire to exclude from this case every source of error, and to show that we must conclude that the increased tension induced by collodion was the only cause of the improvement. The facts, then, which stand out prominently are—

1st. That for three years the patient had been subjected to varied treatment by myself, without satisfactory results.

2nd. That the application of collodion was followed by immediate improvement.

3rd. That no other treatment was resorted to, either simultaneously with, or subsequently to, the local application of collodion.

4th. That it is unreasonable to suppose that any chance circumstances of a general character had any influence, as she has been since exposed to varied temperatures, and has continued her ordinary mode of life, but still the improvement has continued throughout.

5th. That only two changes were induced by the collodion,

viz :—slight increase of thickness and increase of tension, with steadying of the ossicles. We may dismiss the increase of thickness as the cause of the improvement—indeed, it could easily be excluded by experiment. There only remains, therefore, the increase of tension.

6th. That the permanent cure of the relaxation was owing to the action of the collodion, there being no other cause in operation. Besides, the previous experience of the profession pointed to the permanency of the condition when once established, and this departure from the previous invariable rule was, no doubt, owing to the agent now used for the first time.

This now brings me to the enunciation of what I may call a general law, viz. :—

That the structures of a living body, no matter how resistant they may be, expand or contract, as the case may be, under the influence of purely mechanical forces, and may continue in the new condition of expansion or contraction permanently—in other words, the structures of the body accommodate themselves to new conditions most readily. We are all quite familiar with numerous apt illustrations—as, for example, the lengthening of the ligaments and fibrous structures on distension of joints ; the enormous distension of the hydrocephalic head ; the increase of the capacity of the fibrous capsules of various organs; the increase in the area of the cornea and sclerotic under increased intra-ocular pressure, and the diminution under diminished intra-ocular pressure ; the permanent shortening of ligaments, muscles, and tendons, in prolonged flexion of the limbs ; the diminution in area of the capsules of organs on atrophy of the structures of the organ. Likewise, as the membrana tympani permanently increases in area or relaxes under the atmospheric pressure, so it shortens permanently under the long-continued contraction of collodion.—*Dublin Journal of Medical Science, June* 1880, *p.* 502.

DISEASES OF THE SKIN, ETC.

59.—TREATMENT OF NÆVUS BY SODIUM ETHYLATE, AND THE ACTUAL CAUTERY.

By Benjamin Walker, Esq., L.R.C.P., Spondon.

The following two cases of nævus are thought worthy of record, being interesting from their situation, and from the difficulty of treating them by the old method of ligature or suture, which were fairly tried and failed, and from the facility with which they were cured, one by the sodium ethylate of Dr. Richardson, the other by the actual cautery.

Laura L., aged thirteen months. Nævus over right parotid

gland, in size from half-a-crown to a crown piece; skin has a pinkish-blue mottled appearance, and is involved in about one-half its extent. The growth is prominent, and increases in size on crying, it is also gradually getting larger. On Aug. 27, 1878, it was operated on by wire ligature, previously transfixing with needles, and again on Sept. 9 and Nov. 6, but without arresting the progress of the growth. On Nov. 12 sodium ethylate (of one-half saturation) was painted over it, and the application repeated three times in the next fortnight, and five times more at intervals of a month or two, till on Aug. 3, 1879, the nævus was practically cured, the only marks perceptible being from the surgical interference (the entrance and exit points of the needles); had the ethylate been used from the first there would have been none, and its application is attended by little or no pain. To Dr. Richardson we are indebted for a most valuable addition to our armamentarium.

William B., aged five months, a child at the breast, was brought to me on August 28, 1878, with a nævus of the upper lip, involving the mucous membrane, and extending to the gum over the site of the incisors; skin not involved. It gave to the child a pouting and prominent upper lip, and was increasing in size, so as to interfere with prehensile power at the breast, and the child was beginning to fail in its nourishment. On August 28 it was operated on by transfixion and ligature, and subsequently by sutures on Sept. 9 and Dec. 17, but it was most difficult to secure the whole by either method, and the nævus rapidly increased in size. On Dec. 25 the child was placed under chloroform, and the actual cautery applied pretty deeply into the growth in two or three places. Slough separated in a few days, and has left a perfect lip without any disfigurement.—*Lancet, May* 1, 1880, *p.* 680.

60.—ON THE USE OF ARSENIC IN SKIN DISEASES.

By Dr. Robert Farquharson, M.P., Assistant-Physician and Lecturer on Materia Medica at St. Mary's Hospital.

We do not require to be specialists to know, in a general way, which cases of skin disease benefit by arsenic and which are rebellious to improvement under its use. Any practitioner who gravely proposed to treat measles, or small-pox, or scarlet fever, with Fowler's solution, would be looked upon as little short of a lunatic; and all the cutaneous manifestations of syphilis are by common consent regarded as quite outside the boundary of this line of medication. A broad distinction has been drawn in respect of treatment between the moist and the dry eruptions; for, whilst we know that a case of acute eczema, with red smarting skin and copious exudation, is usually made worse by

arsenic, no fact in therapeutics is better established than the disappearance of the same eruption when it has become chronic, under the use of the drug, or the way in which the silvery scales of psoriasis will gradually drop from the skin of the patient who has perseveringly taken his daily doses. All this is part and parcel of the commonest professional knowledge. Can we do more than simply reaffirm the facts? Shall we rest satisfied with their simple possession as mere empirical experience, or may we attempt to explain? Is there any guiding principle which may serve to place our practice on a scientific basis? Is there anything in the physiological actions of arsenic from which we may derive any clue to its practical uses? Writers on therapeutics supply some facts which have been used in explanation; for we are told that various skin eruptions of a vesicular, pustular, and even scaly character, occasionally follow the administration of the drug; and from this we might consider ourselves entitled to argue that it simply acts as a cutaneous stimulant by setting up a new action which may replace, or even permanently displace, the morbid process already going on. But specious although this may seem at first sight to be, it can hardly be accepted, in the absence of more convincing evidence than we can at present bring forward in its favour, for all authorities allow that cutaneous irritation is very rarely observed when arsenic is given as an ordinary nervine tonic; and although skin diseases sometimes seem to grow temporarily worse under its administration, this result does not occur with sufficient regularity to give any really solid support to the theory in question. Arsenic, however, no doubt modifies in some way the nutrition of the skin, by altering its conditions of cell-growth, as Broadbent puts it, "by effecting a change in the blood through a general influence on cell-growth in all the tissues and organs, and a special influence on cell-growth in the skin as the arsenic is passing through it." As a proof of the influence of the drug as a cutaneous nutrient or tonic, I have only to remind you of the sleek and rosy complexions of the Styrian arsenic-eaters, or of the way in which a closely allied drug, antimony, is given to horses to improve the condition of their coats. And in this influence we might, naturally enough, again seek for the explanation of the facts which are acknowledged by all, were it not for the clinical experience already noted, that, whilst arsenic does good in some cases, it appears to be inert, or even positively harmful, in others.

Let us now proceed to consider the mode of administration of our remedy; when should it be given; in what doses; and under what conditions may we hope to ensure its best effects? The question of dosage naturally first presents

itself, and two rival plans have been vigorously supported, both at home and abroad; the first advising us to begin with small doses, and increase with cautious deliberation; whilst the other sanctions a much more decided system of medication. Of these, I unhesitatingly prefer the second—believing that, like quinine and iodide of potassium, arsenic is more likely to produce well marked physiological effects, when given in fairly large quantity than in small. As a rule, I find it good practice to begin with ten minims of liquor arsenicalis, and push boldly on up to fifteen or twenty minims; and, in this way, I have not only obtained results of a very satisfactory kind, but I have seldom had much trouble from the patient's inability to continue the use of the drug. In fact, one girl, eighteen years of age, who was formerly a good deal upset by five minim doses, is now (on the occasion of a relapse of her psoriasis) taking fifteen to twenty minims, with most signal success.

Against one dogma, strongly held by Dr. Begbie and other excellent authorities, I feel it my duty to protest; and that is the necessity for the production of the physiological effects of the remedy before it really begins to act efficiently as a curative agent. Dr. Begbie writes: "I have never seen the loathsome scales of lepra or psoriasis drop from the skin and leave healthy cuticle, till the eye and the tongue manifested that the system was under the influence of the mineral, and that for days and weeks together." Now, in my own experience, I have not only found this to be quite unnecessary, but observation has taught me that, when the eyes begin to smart and the tongue to be covered with a silvery fur, the skin eruption usually becomes worse—not in the sense of that temporary irritation which may give the much needed stimulus to the sluggish progress of the disease, but as a needless, and therefore injurious, addition to the discomfort of the patient, being followed by no improvement, or giving better hope of permanent cure; and, as regards these physiological actions, which I hold we should avoid if possible, I should like to hear the experience of others regarding their frequency, and the order of their occurrence. Slight conjunctival inflammation is probably most usually observed, the patient complaining that his eyes are stiff and aching; and observation detecting fine infection of the superficial vessels, more especially of the lower lid, and, more rarely, a pink zone around the cornea. To this succeeds puffing about the lower lid, and the loose cellular tissue between it and the malar bone, resembling the look of kidney-disease, and being occasionally, according to some observers, associated with albuminuria. The tongue is covered, save at the extreme tip, with a thin greyish fur, through which a few enlarged papillæ are distinctly visible, and the resemblance to an irritable patch of mucous membrane brushed over with a

coating of mucilage at once suggests itself. If the poisonous action of the drug had been allowed to go further, we have a thick yellowish deposit, with bright red tip and edges, suggesting the irritation progressing below.

I have not often detected abdominal tenderness or diarrhœa; but sudden and effectual vomiting, following each attempt to swallow a dose of any of the preparations of arsenic, is an evidence of idiosyncrasy more especially met with in females, and is a fatal barrier to the use of the drug, as every attempt to establish toleration only makes the patient worse. None of the symptoms which I have just described are dangerous in any degree, and require little in the way of treatment beyond a gentle purgative and temporary discontinuance of the remedy; but, as already noted, they are to be avoided, as interfering with the regular and systematic treatment by which we can alone hope to cure, or even alleviate, a case of long-standing chronic skin disease. It may be well occasionally to look to the urine, and see whether renal congestion or actual disease may not be present to interfere with the natural elimination of the drug by the kidney; and thus render it necessary for us to try to find out active remedies elsewhere.

One other physiological peculiarity has been described by Dr. McCall Anderson, and that is the great susceptibility to cold experienced by persons under the influence of arsenic; but I have never seen any direct evidence of this, and would prefer to explain the connection, if it be confirmed, by the action of the remedy in curing or partly checking the cutaneous affection, and thus causing that not uncommon diversion, a metastasis to the bronchial mucous membrane, which might appear to be due to chill or exposure.

Concerning the best mode of administration, I may say that I have always found the liquor arsenicalis to be a safe and reliable preparation, and am by no means prepared to concur in the opinions of those who believe the liquor sodæ arsenitis to be much more free from irritating action. It is an invariable point of practice to direct our patient to take his dose during, or directly after, a meal; and this is a judicious injunction—not only because the metal is less likely to depress and annoy when given on a full stomach, but, following the analogy of other drugs, we may venture to assume, even in the absence of actual physiological proof, that the preliminary solution in the gastric juice or the bile may be necessary to develop its full powers, and to promote its absorption.

Children generally bear arsenic remarkably well; and it has been stated by Bulkley and Ringer, and other authorities, that girls more especially may be given very large doses with impu-

nity. But my own experience is entirely opposed to this; and the only case in early life, where the drug seriously disagreed, happened to belong to the female sex. Lilly H., aged 4, came under my care at the Belgrave Hospital for Children, with an unusually bad attack of psoriasis, due to no ascertainable cause. Five minims of liquor arsenicalis were ordered to be taken twice a day; and a week later, when she again presented herself, I was shocked to see the change in her appearance. From being plump, fresh, and rosy, she had grown dull, thin, pale, and dejected; her lips were dry, the eyes deeply injected, the tongue covered with a dirty yellowish fur and displaying a red tip and edges. The appetite was entirely lost. She complained much of thirst; was very restless and sleepless; skin hot and dry; pulse quick and sharp. The mother stated that, after four doses of the medicine, the child became very sick, and complained much of pain in the back of the neck. Recovery rapidly followed soothing treatment and withdrawal of the drug, and a cure was eventually effected by phosphorus; but the case shows that, even in the very young, idiosyncrasy is occasionally, though rarely, observed, and must at all events be remembered, even although, unfortunately, it cannot be foreseen.

Finally, the all-important question may be asked: Can we really hope permanently to skin diseases by arsenic? I think we may; true although it undoubtedly is that, whilst one case of psoriasis will rapidly improve under its use, another apparently similar in every respect, will prove entirely rebellious; and, over and over again, we shall be disappointed by the frequency of relapse. But, if the eruption come under our care early, and we treat it carefully and systematically, and, above all, continue the medicine for some time after the skin has become smooth and clear, we may promise the best results to our patients. Of course, we may fail by trusting too implicitly to mere drug treatment, and by neglecting other means suggested by general principles and common sense. Good food and mental and bodily rest are of the first importance; and of this I observed a notable example last winter among my skin patients at St. Mary's Hospital. A young married woman, with extremely bad psoriasis, made not the least improvement with arsenic; and, even when the drain of a suckling child was removed, we were surprised to note that the eruption continued as bad as before. It was then found that she was suffering, in addition, from the depressing influence of a bad husband and insufficient food; and, on being taken into the hospital, she very quickly made a complete and satisfactory recovery.—*British Medical Journal, May* 29, 1880, *p.* 802.

61.—NOTES ON THE TREATMENT OF RINGWORM.

By Dr. Wyndham Cottle, M.A., F.R.C.S., Senior Assistant-Surgeon to the Hospital for Diseases of the Skin, Blackfriars.

Few cutaneous diseases have been the subject of more numerous and varied methods of treatment than ringworm. Many of these plans are difficult or painful in their application, and all of them frequently fail in cases of difficulty. Impressed with the unsatisfactory nature of the means at our command for combating this disease, I have long been looking for some manageable and reliable mode of procedure. I was early struck with the ready curability of ringworm in infants and when situated on parts of the body unoccupied by a vigorous hair-growth, and I took the difference to be that, in the more hirsute regions, the materies morbi had invaded and found shelter in the deep hair-follicles, etc., and that the difficulty we experience in eradicating it consists in our inability to attack it in its lair. Observation has taught me that ringworm, even of the most obstinate character and in hair-clothed parts, rarely if ever survives suppuration in its site. We see this when suppurative inflammation has been set up or kerion has supervened. I think this beneficial action results from the presence of some of the inflammatory products affecting the disease in its deep follicular seats, and perhaps from the admission of some of the remedial agents that may be simultaneously applied.

Keeping these points in view, I have endeavoured artificially to imitate this curative action of nature. In practice, I found it no easy matter to accomplish. I endeavoured to find some substance inimical to fungoid growth and also capable of exercising the required action on the skin.

My earlier attempts were made with the sulpho-carbolates of barium and zinc, with which I obtained some success. I used the sulpho-carbolate of barium in the form of an ointment, thirty grains to an ounce of lard, and the zinc salt as a lotion, twenty-five grains to an ounce of water. The suppuration that I succeeded in producing by means of sulpho-carbolate of barium was often slow in developing itself, and occasionally no such effect followed its use. After making trial of various agents, I have obtained the best results by painting the most obstinately affected portions of the scalp with linimentum crotonis and directing the subsequent frequent use of an ointment or lotion of salicylic acid. One application of the croton oil usually suffices to produce a copious pustular rash over the parts with which it is brought in contact. If it fail to do so, the application should be repeated. An ointment of ten to forty grains of salicylic acid to the ounce of the base selected should then be rubbed over the scalp twice or thrice daily.

The strength, frequency, and vigour of the application should be proportioned to the inflammatory effect that results. All crusts, scales, and diseased hairs, should be removed as speedily as possible. Though this mode of treatment is neither suitable to every case, nor universally successful, it possesses some advantages. 1. The croton oil liniment gives rise to no pain at the time of its application, while the consequent suppuration is not in most cases more irksome to the patient than the prolonged and acute pain that attends the use of the usual caustics. 2. Permanent loss of hair does not result. 3. The treatment is easy to carry out. 4. Many intractable cases rapidly mend when so dealt with. 5. The agents employed are not poisonous.

I usually prescribe salicylic acid as an ointment of from ten to forty grains of the acid to an ounce of lard, vaseline, etc., and I often find advantage from combining it with other drugs, as carbolic acid or oil of cade, etc. If it be desired to increase its irritating properties, the addition of a few grains of perbromide of mercury or antimony chloride to the ointment will be effectual. Again, if an eczematous state of skin have supervened, some of the more soothing of the salts of zinc or mercury may be advantageously ordered with the salicylic acid. If a liquid form is preferred, from twenty to forty grains of salicylic acid may be dissolved in an ounce of alcohol and the affected parts painted with the solution two or three times a day. Such solutions often set up much skin irritation.

The following cases of tinea tondens, which I have selected from among my notes, will serve to elucidate the action of croton oil and salicylic acid in the treatment of this disease. They were instances of tinea tondens affecting the scalp. Fungus was present in each, and none are noted as "well" till fungoid growth was unable to be discovered.

Case 1.—Henry C., aged $7\frac{1}{2}$, was admitted at the Hospital for Diseases of the Skin, Blackfriars, on Aug. 14, 1878. The disease was first noticed in Nov., 1877. Nearly the whole scalp was occupied by well marked ringworm. He was treated by ordinary methods till Oct. 9, 1878, under the use of which the disease had become limited to one large patch on the vertex. On Oct. 9, 1878, linimentum crotonis was applied to the patch. On Nov. 6, slight suppuration had resulted. Linimentum crotonis was reapplied. Salicylic acid ointment (twenty grains to one ounce) was applied night and morning. On Nov. 20, he was improved. On Dec. 18, no evidence of the disease could be detected. He remained under observation till Jan. 31, 1879.

Case 2.—George P., aged 6, came under treatment on July 10, 1876. The disease commenced in the previous May.

There was a pronounced patch of ringworm on the left temple. He was treated with cantharides, tar, etc., till Oct. 9. He was improved, but still infected. Linimentum crotonis was now painted over the affected parts. On Oct. 30, suppuration had resulted. On Nov. 13, a portion of the patch showed disposition to scale. I reapplied the croton-oil liniment. On Nov. 27, remains of inflammatory action were visible. On Dec. 11, he was "well."

Case 3.—Henry P., aged 6, came under my care on Sept. 18, 1878. Ringworm commenced about Christmas 1877. There were bare and scaly patches on the occiput. His sister was also affected. On Oct. 16, no improvement had followed the usual methods of treatment. I applied linimentum crotonis to the diseased parts. On Oct. 23, the affected portions were inflamed and encrusted. Linimentum crotonis was repeated. The same application was made to the little girl. On Oct. 30, in the little girl's case, some of the parts to which the liniment was used had suppurated. On Dec. 4, the boy was free from the disease. The girl's head was clear of the complaint where suppuration had taken place. Salicylic acid ointment was ordered. On Jan. 15, 1879, there was no sign of the disease; nor on March 10.

Case 4.—Grace P., aged 7, had three large spots of tinea tondens, of two months' duration, on the head. Her brother had the same complaint. She was treated by the ordinary methods for two months, with some slight improvement. On Jan. 17, 1879, linimentum crotonis was used, and salicylic acid ointment and cod-liver oil ordered. On Feb. 26, the old spots were "well," but two new ones had appeared. The treatment was repeated. On March 12, she was "well."

Case 5.—Charles W., aged 7½, had ringworm over the greater part of the scalp since Sept. 1878. He was treated by a medical man with acetic acid and an ointment of sulphur and carbolic acid. On Nov. 5, 1878, linimentum crotonis was applied to some of the spots. Salicylic acid ointment was used night and morning. On Jan. 6, 1879, there was no evidence of the disease.

Case 6.—Eleanor B., aged 4½, had a well-marked patch of tinea tondens, about an inch and a half in diameter, on the vertex, and several smaller spots, of four weeks' duration. A brother and sister were similarly affected. On Jan. 20, 1877, linimentum crotonis and salicylic acid ointment were ordered. On Feb. 10, the parts were thickly crusted. On March 10, the parts previously affected were well, but a fresh spot had shown itself on the neck.

Case 7.—Marion S., aged 6, had thickly encrusted ringworm of the entire scalp in an active state. The duration of the

attack had been six weeks. She had been previously treated. On Jan. 20, 1877, salicylic acid ointment was ordered. On Jan. 29, the scalp was irritated. On Feb. 12, kerion had formed. On March 12, no tinea tondens could be detected; nor on March 26.

Case 8.—M. B., aged 7, had a large patch of ringworm on the head, with eight smaller ones. On Jan. 27, 1877, linimentum crotonis was applied to the spots; salicylic acid ointment night and morning. On Feb. 10, the treatment was repeated. On Feb. 24, all the spots were suppurating slightly. On March 17, the skin was red. There were a few scales. No fungus was found.

Case 9.—H. D., aged 2, had three large spots of well marked tinea tondens on the head, with numerous disorganised hairs. The disease began about Christmas 1878. There had been no antecedent treatment. On March 19, 1879, salicylic acid ointment was ordered to be used night and morning. On April 2, the patient was better; and on April 23, "well." On April 30, there was no recurrence.

Case 10.—George W., aged 14, came under treatment, on April 16, 1879, with ringworm on the occiput. The duration of this case was one month. The ordinary treatment was pursued. On June 4, there was no improvement. I applied croton-oil liniment, and ordered ointment of salicylic acid. On June 16, the parts had suppurated. On July 14, he was apparently well.

Recent ringworm in healthy individuals, or on parts of the body not covered with thick hair, generally yields readily to any of the parasiticides in common use. I therefore reserve these more severe measures for the cases in which the disease has become firmly rooted. If a tendency to eczema or scalp-irritation exist, a less active treatment is preferable.

Cases of tinea tondens often suffer a relapse, the disease reappearing after an interval. Such an accident can be avoided by careful and constant inspection, and by the long-continued use of some mild antidote. The extension of the disease must also be guarded against. The free application over the surrounding healthy skin of whatever parasiticide is selected will generally act as a preventive. Owing to the necessity of so free and prolonged an use of the remedies, non-poisonous substances are to be preferred.

In almost all the instances in which tinea tondens is chronic and intractable, the nutrition of the patient is defective. They are generally anæmic and thin, with feeble digestion and little inclination for fatty foods. The local treatment should therefore be supplemented by measures for the improvement of the constitutional condition. Fresh air; the addition to the diet

of fatty substances, as cod-liver oil, cream, etc.; the regulation of the digestion; attention to the action of the bowels; and the administration of tonics are generally called for.

The following points seem, then, to be worthy of consideration in the treatment of ringworm.

1. The risk of the extension of the disease should be avoided.
2. Suitable constitutional treatment should be adopted.
3. Recent cases in healthy individuals may be very well dealt with by almost any of the usual remedies.
4. In chronic and obstinate cases, the production of suppuration by croton-oil liniment, followed by the application of salicylic acid either alone or in combination (or of any agents whose action is similar), offers a not unpromising means of eradicating the disease.—*British Medical Journal, May* 29, 1880, *p.* 806.

62.—REMARKS ON THE DIAGNOSIS AND TREATMENT OF SCABIES.

By Dr. William Sang, Broughton Ferry.

The eruption being the prominent and striking feature of the disease, it is necessary in the first place to examine its distribution and describe it. It is generally considered as papular or vesicular in the first stage, and, when allowed to run its course in individuals of filthy habits, becomes pustular. The purely papular or earliest state of the eruption, looked at from a practical point of view, may be disregarded, as in practice it is either the vesicular or pustular condition that is met with. Dr. M'Call Anderson of Glasgow, whose large experience is well known, takes exception to its being described as a vesicular disease. In his work on parasitic affections of the skin he says, "The custom of describing scabies as a vesicular eruption is very reprehensible and apt to lead to error, for those who have studied its manifestations are aware that vesicles are not met with in every case, and, what is more, that vesicular are not the most common forms of the eruption." Farther on he states that "papules are often mistaken for vesicles." We must bear in mind, however, that the converse of this is also true. Indeed, I have once or twice seen vesicles mistaken for papules at first sight, and it was only after pricking them that their true character was known. Dermatologists generally agree in describing it as a vesicular disease, and my own limited experience would lead me to adopt this view.

The vesicular stage is, I think, on the whole most common. Patients of ordinarily cleanly habits or their friends generally have their attention called to it in this stage, and, if it does not disappear after taking some slight purgative and using some

simple external applications, they generally consult their medical adviser, when the following characters will be noted :—The vesicles are generally small, in some cases very small, pointed, or rather conical, and isolated. They are never found in clusters, like those of herpes. They are generally situated in the clefts of the fingers, and more or less scattered along their lateral aspects, a few being found on the posterior aspect, but never on their anterior; also between the cleft of the thumb and forefinger, and along the outer or ulnar side of the hand, never on the palm of the hand. They are almost invariably found encircling like a bracelet the anterior and lateral aspects of the wrist, and scattered here and there on the anterior surface of the forearm, but very few, if any, are found on its posterior surface. Sometimes the eruption is found on the feet in the clefts of the toes, upon the dorsal aspect of the foot, around the ankle, and along the anterior and outer aspect of the leg. On the abdomen, between the umbilicus and pubes, and on the inner aspect of the thighs, a very characteristic condition of the eruption is met with. The vesicles generally have been torn and caused to bleed by scratching, and their place is occupied by a more or less bloody scab. In no case has the eruption ever been known to attack the face or head, and only in a few cases is it seen on the back or shoulders. The pustular stage, or scabies purulenta, as it has been called, is only an advanced or neglected condition of the vesicular, and, in its milder form, only one or two of the larger vesicles in the clefts of the fingers, around the wrist, and upon the forearm, enlarge and become filled with a thick, viscid, yellow fluid or pus. This state of matters, however, still being allowed to run on, we observe that the bases of the yellow vesicles inflame, the vesicles themselves burst, and the yellow fluid exuding forms irregular and dirty-looking yellowish scabs. Sometimes in this condition the whole hand may present a swollen and inflamed appearance, the inflammation being of a purplish hue and erysipelatous in character.

So much for the general characters and distribution of the eruption. Coming back again to the early vesicular stage, and confining our attention to a single vesicle, we observe that it is small and conically-shaped, containing, when pricked, a little clear watery fluid. Springing and running more or less perpendicularly from its base is seen the narrow furrow or cuniculus, at the extremity of which, in a little depression under the epidermis, the insect acarus scabiei is generally found nestled. This cuniculus varies in length from about one-eighth to about one-fourth, or even half an inch, is curved, the curve formed being more elliptical than circular, and, when examined carefully, is found to be a tunnel or furrow running from the

vesicle to the insect. In fact, its appearance is that of a dark curved serrated streak shining through the epidermis. It is attached to the great majority of the vesicles.

One symptom, also, of the disease which requires to be noticed is the itching, from which it derives its popular name of itch. It is sometimes very intolerable and annoying to the patient, being always worst in the evening after becoming warm in bed.

And now regarding the diagnostic points of scabies. In general physicians are satisfied that the disease is scabies when they find a vesicular eruption on the hands, fingers, and forearms, accompanied with intolerable itching at night, especially after going to bed; but from observation I am satisfied that this is not sufficient, and sometimes leads to cases which are eczematous in their character being pronounced itch, and to cases which are really itch, but where the eruption is of a very meagre description, being overlooked. In addition, the cuniculi should be looked for, and one or more of the insects picked from their beds and recognised.

It may be argued that this cannot be done without a microscope, which cannot be always at hand. Of course, if a microscope is at hand, so much the better—the animal will be more clearly demonstrated; but it is not necessary. Nothing more than a good sharp needle, a good pocket lens, and a glass slide is required. With the needle the epidermis is gently removed from the end of the cuniculus, and then, by gently placing its point into the depression, the little creature clutches it at once, and is withdrawn. Its appearance to the naked eye is like a very minute pearl; and when placed on a glass slide, which sometimes requires considerable care, to avoid injuring it, with a good pocket lens its insect character is easily recognised. On several occasions I have picked from six to ten acari off one patient. It is only from between the fingers, along their sides, and round the wrist that I have found them. On the legs and trunks I have searched on various occasions for both cuniculus and insect, but have never been able to find either. From my experience I am decidedly of opinion that, in addition to the character of the eruption, the presence of cuniculi and the demonstration of the insect must be regarded as the diagnostic marks. No doubt, a very puzzling case may now and then present itself, where, from the disease being complicated with eczema, neither cuniculus nor insect can be made out. In these circumstances Dr. Anderson places great importance on the evidence of contagion. In the Lancet of April 4, 1868, there is a very instructive paper on this point by Dr. C. Hilton Fagge. He calls attention to a case which came under his notice in which the vesicles were large like bullæ, and no cuniculus could

be discovered. By the use of a magnifying glass, however, he discovered whitish lines on the summits of the vesicles between the fingers. He therefore cut off the summits of one or two of these vesicles and placed them under the microscope, $\frac{1}{8}$ objective of Oberhauser. On one of these sections he was able to recognise what was undoubtedly the head and anterior parts of an acarus, and thus settle the true nature of the case. Another method of diagnosis which he mentions, but which, from a letter by the late Dr. Tillbury Fox which appeared a week or so subsequently in the same periodical, was known and practised both by himself and Continental dermatologists, namely,—collecting the crusts, about as many as would cover a shilling, and placing them in a test-tube with a solution of caustic sodæ, ʒ ss. of solid hydrate to ℥j. of water, and boiling. In the deposit skeleton acari, eggs, etc., will be found under the microscope. Another device worth mentioning in doubtful cases is to scrape what may appear to be the base of a cuniculus with the point of a lancet, and place the contents under a microscope. Eggs, or other traces of the insect may be detected.

Treatment.—When once properly recognised, the treatment of scabies is in most cases simple and satisfactory. The first point to be attended to is, of course, isolation of the patient and all his belongings. Then some external application to destroy the insect must be used. There are many preparations that will do this, and consequently cure the disease. Almost every specialist seems to have his own favourite ointment or lotion. Sir Robert Christison is in the habit of using a lotion of chloride of lime, one to forty or sixty parts, and applied five or six times a day, or continuously with wet cloths. The case is generally cured in eight days. Hardy uses a sulpho-alkaline ointment composed of carbonate of potass, sulphur, and lard. Dr. M'Call Anderson prefers using styrax ointment, which he says "is clean looking, has a pleasant aroma, and soothes rather than irritates the skin." Erasmus Wilson uses the old sulphur ointment, and I think with the profession generally it is the remedy that is most extensively used. I am generally in the habit of directing my patient to have first a warm bath in the evening, using soap and water freely; then, after being dried, to have the sulphur ointment well rubbed into the skin all over the body, but paying particular attention to the clefts of the fingers, wrists and forearms—in fact, where the eruption is generally found,—the head and face, of course, are excepted; then to go to bed in this state, and in the morning have a second bath to wash it all off and clean the skin.

In many cases this is sufficient, but, if necessary, it may be repeated a second or third time after an interval of one or two

nights. I have never seen this treatment fail, and therefore very seldom use any other. The chief objection to it is its rendering the exhalation from the body very offensive; but if used legitimately, and as I have described, this happens only in a very slight degree. This condition is chiefly the result of excessive use of the remedy.

A preparation of sulphur and lime is used very much in hospitals and schools. It has the advantage that a single application is sufficient. This is true; but from what I have seen myself it has some serious disadvantages. It is very irritating, and always leaves the skin in a very rough, scaly condition, almost like pityriasis, and in severe cases of scabies, where the hands are pustular, although curing, it generally causes an inflamed condition of the skin often more difficult to cure than the original disease. In private practice, therefore, I never think of using it, and even in public institutions I would not be inclined to make it the regular remedy. The late Professor Bennett used to recommend the use of simple lard, simply smearing the body all over with it so as to smother the insects. In very young children I generally do this, but after the age of four or five years prefer using a specific.—*Edinburgh Medical Journal, June* 1880, *p.* 1083.

63.—ON LUPUS AND ITS TREATMENT.

By Jonathan Hutchinson, Esq., F.R.C.S., Senior Surgeon to the London Hospital, and to the Hospital for Diseases of the Skin.

It is an essential feature of all forms of lupus disease, that the cell-growth once originated shall be infective, and shall cause similar disease in the adjacent skin. Lupus is always serpiginous, and it becomes so in virtue of the law of contagion by continuity, or, to express the same fact in more anatomical language, because its cell-structures spread along the perivascular spaces. Whilst thus asserting this tendency to lateral growth as an invariable feature of all that we call *lupus*, it is important to immediately add that it never shows any power of spreading deeply. From beginning to end, it is a disease of skin or of mucous membrane, and only by accident are the deeper tissues ever involved. In this limitation to the structure, it differs definitely from the forms of new growth which we class as "malignant." Its alliance with common inflammation is shown by similarity in exciting cause; for it is often, indeed usually, induced by some slight local injury or irritating influence. Its peculiarities, which are very considerable, are evidently due to the state of cell-nutrition and tendency possessed by the patient, and not to anything special in the

exciting causes. It becomes, therefore, of great importance to study carefully its predisposing causes, and upon this head I will submit for discussion the following assertions.

The evidence is overwhelming that lupus, when correctly diagnosed as such, is a malady wholly independent of syphilitic taint.

Whilst there is no reason to believe that syphilis, either inherited or acquired, has anything to do with common lupus, there is good reason for associating the latter with two or three other well recognised constitutional conditions. I refer especially to the state of health known as scrofula, to that which produces relapsing symmetrical skin-diseases of the psoriasis type, and that condition of feeble circulation which favours the occurrence of chilblains. Amongst these three, lupus seems to divide its allegiance, approaching more closely now to one and now to another. The division is, however, by no means equal, and the larger number of lupus cases partake more closely of the scrofulous character than of any other. Next to scrofula probably comes the chilblain tendency, and lastly that to psoriasis. But many other strumous maladies are closely related to congenital feebleness of circulation, and even chilblains themselves are, perhaps, in some sense strumous; and thus we may perhaps, for practical purposes, consider that lupus is scrofulous disease of the true skin, modified more or less in individual cases by other tendencies. From what is sometimes vaguely spoken of as scrofuloderma, it is to be distinguished by the circumstance that the latter almost always begins under the skin in the cellular tissue or lymphatic glands. In such, the skin ulcerates secondarily. There is no form of disease of the true skin beginning in it of a scrofulous nature to which the name lupus is not applicable. It is, I feel sure, impossible to assign any lines of demarcation between scrofulous disease of the skin and lupus, and the attempt to do so is probably a violation of pathological laws.

The first great natural division of lupus cases ought, I think, to be into those which observe the type of *lupus erythematosus* and those which keep to that of the common form. Between these there are such important clinical differences, that some even doubt whether it is wise to continue the term *lupus* for the erythematous form. I do not myself feel any hesitation on this point. The erythematous form is certainly lupus, although it has differences which must be carefully noted. There are, however, such numerous points in common, and so many mixed cases occur, that it would be most unwise to attempt their complete separation. The most important peculiar feature of *lupus erythematosus* is *its tendency to symmetrical development.* Common lupus is never symmetrical, except by accident; but the

erythematous variety is almost always so. The latter begins usually on the nose, produces next two symmetrical, but often not continuous, patches on the cheeks, then attacks the two ears, and next the backs of the two hands. This law of distribution acknowledges but very few exceptions, and it implies, I think, a relationship on the one hand to psoriasis, and on the other to chilblains. Perhaps its alliance with the chilblain diathesis—that is, with congenital local peculiarities of circulation and cell-nutrition—is its most marked feature. But whatever may be the peculiarity which gives proclivity to lupus erythematosus, there can be no doubt that the process, when once begun, is one of lupus. It affects adjacent parts by contagion of continuity, and thus spreads serpiginously; it produces new islands of disease near to the parent one; it persists indefinitely; and when it disappears it leaves scars. As a rule, it attacks patients of about the same age and in similar states of health to those who are the subjects of common lupus; and equally with the latter it is free from any suspicion of being due to syphilis.

As varieties of lupus erythematosus, we may mention *lupus sebaceus*, in which there is frequently no erythema whatever; and *lupus erythematosus hemorrhagicus*, in which the erythema element is intense and produces proneness to bleed. To these might perhaps be conveniently added another very rare one, in which patches which cannot be distinguished from nævus spread widely at their edges and ulcerate like lupus.

Of *lupus vulgaris* we may, for purposes of clinical convenience, recognise the following varieties.

1. *Single-patch Lupus*, in which the patient, through a long course of years, has lost the original patch. In these cases, there is rarely much tendency to ulceration, and the strumous diathesis may be supposed to be but slightly marked, and the patient in good health. Often the patch is in one cheek, but it may chance to be on any part of the body.

2. *Many-patch Lupus.*—In a large majority of cases, common lupus shows itself in more than one place. When smaller patches occur near to the parent one, they are probably due to infection from it; but when at distant parts of the body, they may not improbably be quite independent of it, and due to diathesis. For cases in which the multiplicity of patches is great, the patient being spotted over with them, I proposed some years ago the name *lupus psoriasis;* but I now admit that it is not closely appropriate, since the lupus patches are never arranged symmetrically, as are invariably those of psoriasis.

3. *Ulcerating Lupus.*—It is very difficult to apply the term ulcerating so as to distinguish by it any special variety of lupus, since ulceration, in greater or less degree, is present in a

majority. There are cases, however, in which the tendencies to common inflammation are so great, and ulceration occurs so early, that the special features of lupus are almost lost in granulation-masses and pus-crust. In these cases, the strumous diathesis is usually strong. The part affected has also some share in developing the proneness to ulcerate: thus lupus on the feet almost always ulcerates early.

4. The term *Acne-lupus* may be given to the disease when it occurs in scattered spots, like those of acne or impetigo. It is well illustrated in the portraits which I exhibited in the annual museum some years ago. It has also, I believe, been carefully described by one whose recent loss to dermatology we all deeply lament.

5. It may perhaps seem strange to many to suggest the term *Eczema-lupus*. The characters of eczema and lupus are generally wholly distinct. There is, however, a very rare form of lupus inflammation of the skin which looks exactly like eczema. The state of the surface is not to be distinguished from eczema, and the diagnosis can be based only on the history that the patch has existed for years, that it slowly spreads at its edge, is amenable to no treatment, and when cured leaves a thin scar. In respect to the extreme thinness of the lupus growth, this form resembles lupus erythematosus; but it is never, like it, symmetrical.

6. *Lupus marginatus* is a name which I have ventured to give to a very rare and very peculiar form of lupus, in which the margin is extremely thin and delicate, and in which, with no visible ulceration, a very superficial scar rapidly forms in the centre. It is certainly in essential features a lupus; and it differs from lupus erythematosus in not being very vascular, and in having no tendency to symmetry. I have seen but two or three examples of it.

It would not be difficult to mention several other very exceptional forms of skin disease in which the features of lupus are assumed, and which ought, I think, to be recognised as its congeners. It is to be understood, however, that for the purposes of ordinary practice it is sufficient to recognise the common and erythematous types and to keep in mind that tendency towards scrofula, towards chilblains, and towards psoriasis give peculiarities to individual cases.

It is necessary, in order to complete the subject, to say a word or two as to lupus of mucous membranes. Lupus of the gum is not uncommon, and from the gum it not unfrequently extends to the palate. It is very seldom seen in the pharynx, and I am not aware that it has been traced lower in the alimentary tube. Lupus of the conjunctiva constitutes a rare and very peculiar form of disease. In the rectum and vagina, lupus is probably very unfrequent, and its examples in these regions

have not as yet been identified with sufficient accuracy to permit of much being said about them.

If I have been detailed almost to tediousness in particularising the causes of lupus and its alliances with other maladies, I had before me the desire to clear the ground for the establishment of definite principles of treatment. I have tried to prove that lupus is mainly a scrofulous malady; that it is influenced by the causes which induce chilblains; and that in some cases it has an alliance with psoriasis. I have asserted further that it has no connection with syphilis. From these data, the rules for treatment, or at any rate for constitutional treatment, are easily evolved. We must improve the patient's state of nutrition by tonics, good food, bracing air, cod-liver oil, and the judicious use of stimulants. To all these, arsenic—the specific for psoriasis—may usually with much advantage be added. We must further protect our patients from the influences which cause chilblains; send him to a warm climate in winter, or failing that, make him keep the house as much as possible. We must abstain from enfeebling the health by iodides and mercury. But, since the lupus growth is self-infective, it is impossible, when once it has begun, to arrest its spread by attention to the general health. We may perhaps prevent ulceration, but that is often all. As far as the cure of the local process is concerned, it must be effected by local measures, and these measures must be of the nature of destructions. The new cell-growth must be destroyed, eradicated without delay and without flinching. Without doubt, the most important point for discussion is as to the best means of destroying the vitality of the lupus growth. I have had considerable experience of these methods—the use of caustics, the actual cautery, and Volkmann's erasion method. All are very good, but I unhesitatingly prefer the last. If caustics are used, they must be used very freely. I have repeatedly seen a patch wholly cured by a single dressing with chloride of zinc or acid nitrate of mercury. As a rule, these remedies were used too timidly or without sufficient painstaking. They give more pain than the actual cautery, but their sores granulate better and heal more quickly. The actual cautery is comparatively painless, can be easily limited, and at the same time made to act deeply. It is very efficient, but its burns are sometimes slow to heal. The erasion treatment appears to give less pain, to be very efficient, and to leave a sore which heals rapidly and soundly. Its introduction will, I think, mark a new era in the treatment not only of lupus, but of rodent ulcer. It is so simple, so easy of employment, and has in it so little that is alarming either to surgeon or to patient, that it is likely in the future to be employed in the early stages, whilst there is good hope of the complete cure of the disease.

Lupus erythematosus is often benefited by solutions of tar and of lead and the free internal administration of arsenic.—*British Medical Journal, May* 1, 1880, *p.* 650.

64.—THE USE OF IODIDE OF STARCH IN THE TREATMENT OF LUPUS ERYTHEMATODES.

By Dr. McCall Anderson, Professor of Clinical Medicine in the University of Glasgow.

Everyone conversant with the treatment of lupus erythematodes must be well aware how obstinately it resists internal remedies. At all events, my own experience hitherto has been that no internal remedy is capable of itself, even in isolated cases, of removing the eruption, although I have known it to disappear spontaneously.

Any medicine, therefore, which, in a certain proportion of cases, is capable of ameliorating this condition, must be hailed with satisfaction; and that will be found to be the case with iodide of starch. I learned this fact in the following way. My friend Dr. Colligan of Paisley sent me a patient labouring under well-marked lupus erythematodes some years ago. We agreed to try from time to time various local applications, which certainly effected some improvement, but altogether failed to eradicate it. A considerable time after this, happening to meet Dr. Colligan in connection with another patient, he said to me: "By the bye, do you remember the patient I sent to you with lupus erythematodes? I used all the applications you recommended, but they did not remove the eruption; so I thought I would try the internal adminstration of the iodide of starch which I had often seen employed for other diseases by Dr. Andrew Buchanan, when I was a student. Well, I gave her a teaspoonful of it three times a day, and in two or three weeks the eruption was gone." I expressed myself equally surprised and gratified, and promised to give it a trial. For a couple of years before this, I had been seeing from time to time a lady, the sister of a medical friend, who suffered from the same complaint in an aggravated form, not only on the face, but also on the head; and, although some impression was made upon the disease by means of local applications, the results of the treatment had been anything but satisfactory. I therefore wrote to the doctor, mentioning Dr. Colligan's experience, and suggesting a trial of it in his sister's case, which he did. Some time afterwards, the lady came to see me, and I must confess that I was astonished to find that in her case too a great amelioration had taken place in her state (although she could not be said to be completely cured), much greater than from the previous per-

sistent use of most of the recognised remedies, and that without the simultaneous use of any external treatment whatever. Since that time, I have in many cases used the remedy in doses of from one to four teaspoonfuls in water or water-gruel three times a day, and while in some no result whatever has followed, in a fair proportion of them much benefit has accrued; so that I now regard it in the light of a valuable addition, though far from an infallible remedy, to our means of combating one of the most obstinate diseases of the skin.

For the introduction of the iodide of starch as a remedial agent we are indebted to Dr. Andrew Buchanan, whose papers upon the Physiological and Therapeutical Effects of Iodine (London Medical Gazette, vol. xviii., p. 515, and vol. xix., pages 41 and 80) will well repay perusal. Owing to the irritant local action of other preparations of iodine, he was led to look out for some new medicinal preparation which might be less acrimonious in its local action, while its absorbability and alterant virtues were not diminished, and for this purpose the iodide of starch suggested itself to him; and there can be no doubt that by employing it much larger quantities of iodine can be introduced into the system, even to the extent of over seventy grains daily.

The following is the formula for its preparation: ℞. Iodi gr. xxiv.; amyli ℥j. Triturate the iodine with a little water, gradually adding the starch and continuing the trituration till the compound assumes an uniform blue colour, so deep as to approach to black. The iodide should be dried with a heat so gentle as to run no risk of driving off the iodine, and it ought to be kept in a well-stoppered bottle. On no account should spirit be used in its preparation instead of water, as sometimes recommended. The dose is a heaped-up teaspoonful in a draught of water or water-gruel thrice daily; but it may be safely increased, even up to an ounce in some cases, if necessary to make an impression on the disease. I have generally found, however, if it be going to do good in lupus erythematodes, that the first-named dose is sufficient. Those who are inclined to give it a trial, should take care of two things: first, that the cases they are dealing with are really undoubted ones of lupus erythematodes and not lupus vulgaris; and second, that the medicine is freshly prepared and in accordance with the directions above mentioned.

In conclusion, I may say that I have found the iodide of starch an excellent remedy in other diseases, and notably in old-standing cases of syphilis; but upon this I need not enlarge at the present time.—*British Medical Journal*, *May* 1, 1880, *p.* 652.

65.—ON THE TREATMENT OF LUPUS BY LINEAR SCARIFICATION.

By Dr. Balmanno Squire, Surgeon to the British Hospital for Diseases of the Skin.

The treatment of lupus by scarification is not new. Scarification, in the form of so-called "multiple *punctiform* scarification," has been employed for many years in the treatment of lupus, and with considerable success in many countries. The first observer who reduced it to a demonstrable success was the now venerable Dr. Dubini, of Milan; and it subsequently derived a considerable impetus from the warm advocacy of Dr. Volkmann of Halle, in Prussia.

Multiple *linear* scarification was first proposed by myself, now a few years since, as an improvement on the Dubini-Volkmann method. Its effect is similar, only that it is more thorough, and that the results obtainable by means of it are more prompt, and at the same time it provides more effectually against relapses. But the principal claim that the operation may possess on the attention of the profession as a serviceable resource in this, one of the gravest of the diseases of the skin, rests on the strong support which it has recently won for itself. Dr. Walter Smith of Dublin, Mr. Malcolm Morris of London, and Dr. Vidal of the Hôpital St. Louis in Paris, have tested it, and have spoken of it with approval in the writings which they have published.

Like punctiform scarification, it effects, by section of the capillaries, a prompt decrease of the hyperæmia of a lupus-patch, and coincidently, by the traumatic inflammation it excites, it causes the disappearance of the new formation special to lupus. The careful microscopical researches of Dr. Vidal have shown that the lupus-cells, under this process of treatment, undergo conversion into fibrous tissue. By observation of preparations of sections of the lupus-patches, obtained at different times during treatment by scarification, he has ascertained that the lupus-cells gradually alter their configuration and assume the shape of fibres of connective tissue.

This observation is of some practical importance, as serving to explain an advantage which both Dr. Vidal and I have frequently remarked as special to this plan of treatment; namely, that no loss of substance results after the cure of the disease by this method. Now, this is a matter of prime moment in a disease which is especially apt to invade the face, but more particularly when it affects the nose—a feature often attacked by lupus.

Under any other method of treating lupus with which I am acquainted, the nose, in the condition in which it commonly

comes under observation, is in great part necessarily lost, even when treatment happily achieves the complete cure of the disease; but, when the treatment is by linear scarification, the nose may often be actually *rebuilt;* so that the organ, already in part virtually destroyed, may at length be regained in its original form. In other words, the lupus-tissue, which has come to replace the substance of the true skin, instead of undergoing actual destruction—as, for example, it does under treatment by cauterisation—or, again, instead of undergoing molecular ulceration by the application of semicaustics, such as the red iodide of mercury, advocated by Dr. Hardy of Paris,—becomes actually the material out of which repairs are constructed. The practitioner, no longer glad to be content with arresting the lupus in its present state of progress, finds himself able to cause the disease to retrace its steps, and to restore out of its own means that fibrous tissue which it has slowly, and yet apparently surely, destroyed. It is to the microscopical researches of Dr. Vidal that I am indebted for the *rationale* of the result. By means of linear scarification, I have succeeded in reconstructing a nose which externally as well as internally—that is to say, both as regards skin and mucous membrane—was converted into fungous granulations, consisting wholly of rotten lupus-deposit, and supported by cartilage which a little later must surely slough away; and so I have seen a nose which apparently could only end in a withered stump, regain its original form with scarcely any alteration of its original condition.

Dr. Vidal has recorded a case in which he treated a portion of a lupus-patch by means of erasion—namely, in the centre, and by linear scarification over the rest of the patch. After the cure of the case, a depressed scar existed only over the part treated by erasion. A model of the case is preserved in the museum of the Hôpital St. Louis. I have recently seen it, and think it illustrates very fairly the difference of the two kinds of treatment.

There are various details in conducting the operation. The operation is painless, if the skin be first frozen by the ether-spray. It may be rendered expeditious by a multiple linear scarifier which I have devised, and which has been constructed for me by Messrs. Weiss, of London. It is in every way less irksome to the patient than any other means of local treatment; that is to say, than any other means (of efficacy) of which I am aware. I do not speak of internal remedies, since I have found them to fail.

It remains to compare the effect of linear with that of punctiform scarification. The latter consists of stabbing the affected skin with a fine needle, or with the point of a narrow lancet.

This method fails in precision. It is impossible to space the punctures equidistantly; and, in practice, the skin presents always, after the operation, clusters of punctures more or less crowded on one another, with intervals of but scarcely punctured skin; whereas in linear scarification, especially if it be performed with a suitably adjusted multiple scarifier, the incisions are *equally* spaced, so that even at the first operation the effect produced is uniform; whereas by repetition of the operation, veering the direction of the incisions at each repetition, the complete disappearance of the disease may be speedily arrived at.

I have only to add that the little cuts heal completely within a week, so as to permit a repetition of the operation; and that eventually the cuts leave no perceptible trace of their existence. In fact, they disappear *absolutely* after a moderate interval. A satisfactory amelioration of the disease results within a few days after the first performance of the operation, which needs to be repeated, as to some cases, only a very few times in order to ensure a complete and often a lasting cure.—*British Medical Journal, May* 1, 1880, *p.* 654.

66.—TWO CASES OF LUPUS TREATED SUCCESSFULLY BY THE EXTERNAL APPLICATION OF CARBOLIC ACID.

By Dr. J. C. Hall, Monaghan.

Having seen carbolic acid spoken of rather favourably as an external application in the treatment of lupus, by Dr. I. Neumann, of Vienna, I determined to try its efficacy in that disease, and had an opportunity of doing so in two cases with the following results:—

My first patient, E. T., æt. 16 years, an unhealthy anæmic girl, with a family history of phthisis (though none of her immediate relatives died of that disease), was admitted into Monaghan Union Workhouse Hospital on 4th March, 1880. She had suffered from lupus of the nose for $2\frac{1}{2}$ years which caused partial destruction of the right ala. There were also patches of lupoid ulceration on septum and floor of nasal cavity, gum of upper jaw on right side, and left tonsil. I put her on cod-liver oil, syrup of the iodide of iron, and painted the ulcerated parts with pure carbolic acid twice a week. After a few applications the diseased parts of nose began to look better, but the gum and tonsil were very obstinate. However, at the end of two months they yielded to the treatment, and she was discharged cured on May 11, 1880.

My second patient, Mrs. D., æt. 45, was admitted to hospital on 5th May, 1880. She is mother of three children, all of whom are healthy. Her mother died of phthisis, but she herself has always enjoyed good health. The lupus began in her

case three years ago on the tip of her nose. By degrees it spread to both alæ and septum, and involved the entire muco-cutaneous surface of nostrils, which, when I saw her, was covered with thick hard scabs; the external surface of nose, extending as high as the bridge and to the cheek on either side, was of a dark red colour, with here and there patches of a darker red about the size of a small pea, and a few small round ulcerated patches. The entire red portion was covered with dry bran-like scales. The disease in her case was the form known as lupus erythematodes, and caused little or no loss of tissue, although of three years' duration. I gave her four m. doses of liq. arsenicalis three times a day, and had nose poulticed until scabs came off, leaving an ulcerated surface behind, which I painted three times a week with pure carbolic acid and the red non-ulcerated portion twice a week. After a short time the ulcers began to heal, and the red non-ulcerated surface to assume a pale and healthy appearance. She was discharged cured on 30th May, 1880. I may mention here that the application of carbolic acid caused little or no pain after first minute. The rapidity of the cure in this case may have been accelerated by the arsenic; but the first case, never having had any, shows that the chief remedial agent was carbolic acid.—*Medical Press and Circular, Aug.* 25, 1880, *p.* 155.

67.—ON THE ETIOLOGY OF TRUE LEPROSY.

By Jonathan Hutchinson, Esq., F.R.C.S., Senior Surgeon to the London Hospital.

Very various articles have been thought to have a share in the production of the disease. The use of milk in a state of decomposition has been suggested as a cause. Milk is used in excess in some districts where leprosy prevails, but not in all; and then one would expect to find the disease at least as common inland as on the coast; but with some apparent exceptions, to which I shall refer presently, the disease is most common on the coast. The Norwegians are certainly fond of decomposed cheese, but so are the inhabitants of some parts of Germany where no leprosy exists.

Pork is another article of diet which has been thought to be a cause. But the Jews who eat no pork, are not exempt from leprosy, nor are Mohamedans who also abstain from this meat. It has been said that my theory—that fish is the cause—cannot be true because Jews and Mohamedans do not eat fish; but this is a mistake, they do eat fish—that is, certain kinds of fish.

The excessive use of *maize* has been thought to account for the prevalence of the disease; but leprosy prevails where maize does not grow. The same has been said of rice, but

there is the same objection : a person writing about the disease in India may be pardoned for coming to this conclusion, but anyone reviewing the whole subject here in London can see at once that these views are untenable.

The use of *bad corn* has been suggested as a cause, but bad corn is eaten in places where leprosy does not prevail. Pellagra is certainly due to the use of diseased maize, but this is not leprosy.

I need, however, scarcely mention all the articles of diet upon which suspicion has fallen, but will at once proceed to state the conclusion at which I have myself arrived and that is, that fish is the one sole cause of leprosy. I do not mean to assert that the use of fish always causes leprosy, but that some poison generated in connection with fish causes the disease. How does this hypothesis agree with the chief facts relating to the natural history of leprosy. We find that nearly everywhere the disease is most common on the seashore, and that when it spreads inland it generally occurs on the shores of lakes, or along the course of large rivers; we find also that fish is largely eaten wherever leprosy prevails. I don't believe that any other article of diet has any influence whatever on the causation of the disease; this is so special in its character that it seems evident that it must have one special cause. I believe, however, that certain conditions greatly modify the action of this cause. We see that draymen drink an enormous quantity of wholesome beer before they suffer from gout, but others who obtain their beer under less favourable conditions get gout though they drink but little. And so with the fish : in some places we find that a large quantity is required to produce leprosy, in others a small quantity will suffice. Fish bred in warm waters seems to be more dangerous than that found in cold; fish in a state of decomposition is more dangerous than fresh fish, and fish in a special state of decomposition is very dangerous; the crustacea, although strictly speaking not fish, are also very dangerous. As regards the history of the disease we know that the Egyptians, amongst whom leprosy prevailed at a very early date, were large eaters of fish. The Hebrews, we are told, wept over the memory of the fish they had eaten in Egypt: they acquired the habits of the Egyptians, and they acquired leprosy. The same cause probably prevailed among other old races.

But we find that leprosy faded away before the advance of agriculture, and that now it is only met with in certain districts; that it prevails amongst the well-clothed and the ill-clothed, in cold countries and in hot, and that the only constant factor is the diet. I may remark that amongst a rude people the first food available in any large quantity is fish; it is easier to catch

fish than to kill wild animals, and besides a supply of fish is accessible at times of year when nothing else can be obtained. Then we find that savage people like decomposed food: the only article of diet which we now eat in a decomposed state is game, but our forefathers liked many other things "high" which we should now consider unfit to eat; decomposed fish used to be considered a delicacy.

As the population increases fish becomes scarce: the seaboard remains the same, and the available supply has to be divided amongst a greater number. At the time of the Reformation, when the eating of fish on certain days ceased to be obligatory, the fishermen were afraid that their living would be gone, and laws were passed for their protection. Who would think of such a thing now? The constant cry is that fish is so dear, in spite of increased enterprise and improved transport the supply cannot equal the demand. Then, as might be expected, the consumption of the coarser kinds of fish diminishes as other kinds of food become accessible: this especially applies to inland districts—as the population increases fish becomes a luxury inland, and so we find that, as a rule, leprosy disappears earliest in inland districts, and lingers longest on the coast.

As civilisation advances roads are improved, and there are increased facilities for transit. This acts in two ways in checking the prevalence of leprosy—first, it increases the area over which the supply of fish is spread, and increases the demand, and secondly, the fish is delivered in better condition, and is less likely to become decomposed before it reaches its destination.

Next, how does the fish theory accord with what is known about the present distribution of leprosy?

First, in Europe: in Norway leprosy is most common at Bergen, a town which boasts of the largest fish market and the largest leper house in the kingdom. At Christiana the disease is unknown, except from imported cases. Leprosy begins to be endemic at the point where the Gulf Stream strikes the coast; here the fiords do not freeze in winter, though further south they do. As we go north the disease gradually becomes less common. The land in this part of the country is poor and rocky, and the inhabitants live almost wholly on fish. Dr. Danielssen, a Norwegian physician, gives the following account of their diet, I quote from Dr. Liveing's book:—

"Herrings are generally used in a salted state, rarely, if ever, are they eaten fresh. The peasant of the western coast is so little delicate about this article of food, which forms so large a proportion of his daily sustenance, that he often devours it in a putrid state. When the herring fishery happens to be in places where assistance is not at hand, as is often the case in North Bergen, a large number of herrings are thrown on shore

and left for many days waiting for purchasers. Should these not appear, the peasant appropriates the fish to his own use, and adding a small quantity of salt to the half-rotten herrings, conveys them home. After the lapse of some weeks these herrings are in a manner pickled, that is to say, they are in a state of decomposition, and then they become the daily food of the whole family. Each week, until they are consumed, they become more and more decayed, but nevertheless the nauseous food is eaten till not a herring is left. Nay, so constant is this hateful custom among the peasantry that they will not touch fresh fish, but prefer to leave it for some days till incipient decay gives a zest to their coarse palates."

"The truth of the latter part of this statement," adds Dr. Liveing, "I can fully bear out from my own observations." If disgusting and half-rotten animal food has any influence whatever on the development of leprosy, the west coast of Norway is, of all countries, the most favourably circumstanced for its production.

In the Faroe Islands leprosy has been rapidly disappearing since the inhabitants gave up the herring fishery and took to agriculture, and in Sweden, where it once prevailed extensively, it also died out after the cessation of the herring fishery at the beginning of this century, and now only lingers in one fishing village.

In Russia leprosy is met with in only two districts, one in the north and the other at the extreme south, both on the seaboard. In the rest of Europe it exists only in the part of Norway to which I have referred, in Iceland on the side which is washed by the Gulf Stream, but not in the north and east, and the head-quarters of the disease is a fishing town. It is met with also in a few places on the Mediterranean: when I was at Bergen I saw a vessel in the harbour, which had brought a cargo of copper ore from one of the Spanish seaport towns where leprosy is still seen, and it was being loaded with a return cargo of fish.

In Madeira the disease is thought to be due to poverty with uncleanliness and unwholesome food. Yet, though four-fifths of the inhabitants are very poor and live badly there are only eighteen lepers on the island, and of these one is a clerk in a wine store who has not been subjected to any privations. But if you should visit the island residents will warn you if you meet a peasant carrying a basket up from the shore to keep to windward of him, as it may probably contain stinking fish which is a recognised, and with some a favourite, article of diet.

In India leprosy is very prevalent, and it is here that the apparent exceptions to the fish theory are most numerous. The disease prevails to some extent everywhere; it is most common

in the neighbourhood of Calcutta, next on the banks of the Ganges, and next in order comes Nepaul. The facts collected in the Report on Leprosy of the Royal College of Physicians respecting the conditions under which the disease prevails in India are very valuable. With some exceptions it is found that leprosy prevails most in districts where the population is poor and fish diet is common, as along the course of the larger rivers, and in places where much preserved fish is consumed. In opposition to the fish theory mention is made of a Somali tribe who suspected that fish-eating caused leprosy, and accordingly have for a long time abstained from fish entirely; yet a few cases of leprosy still occur among them. But I don't think that this tells against my theory but rather in its favour; for it is evident that leprosy must have been formerly very prevalent amongst these people or they would not have thought of submitting themselves to such a restriction of diet: now the disease is slight. I may add that the same suspicion with regard to fish was current in Cornwall, and in other places where the disease occurs.

Then we have found that it is incurable where it originates, but is curable elsewhere. I have mentioned the case of the lady from Jamaica who had suffered severely from leprosy, but was cured after a residence of twenty years in England, and I mentioned also the case of the Norwegian immigrants in America. I suggested that this incurability must be due to a persistence of the cause. What is the diet in the leper houses? At Bergen I found that the patients had fish three days a week. In British Guiana we are told that they have fish every day, and in Barbadoes "salt fish daily!"

One of the principal objections which has been brought against this theory is, that leprosy prevails inland, in places where the consumption of fish would not be supposed to be great. It is true that the disease does prevail in inland districts to a certain extent, but it is not so common as on the coast, and wherever it occurs fish, either fresh or preserved, is easily accessible. Some of the statements made in opposition to my explanation of the etiology of leprosy have certainly been very reckless. Thus Dr. Day, who holds high position as a naturalist in India, and is especially an authority on the subject of fish, tries to confute me by saying that, although the Burmese consume large quantities of nga'pee (preserved prawns), yet he had never seen a leper in Burmah, and that the disease is as common in the inland districts of India as it is on the coast. As to the latter statement I have already admitted that the distribution of leprosy in India does show some remarkable exceptions from the general rule that the disease is most prevalent on the coast, but as regards the first assertions

that leprosy does not exist in Burmah, I find on turning to the Census return that the proportion of lepers to the rest of the population is larger in British Burmah than in India, and it is stated with reference to this prevalence of the disease that the inhabitants are neither dirty nor underfed, but that they are much given to the use of unwholesome fish. Colonel Yule, a high authority, says that 13,500 tons of nga'pee are consumed in Burmah every year. A patient of mine who had travelled in Burmah informed me that lepers swarmed all over the country, they were so numerous that the government did not know what to do with them. Dr. Day seems to have some peculiar ideas on the subject, for he speaks of "congenital leprosy"—there is no such thing as congenital leprosy—and says that he looked for the contraction of the fingers and toes which is seen in the children of lepers, a sign which has never been observed by me or, so far as I know, by any other observer.

This prevalence of leprosy in Burmah may I think throw some light on the cause of its prevalence in the interior of India. As we have seen elsewhere the danger from the consumption of fresh fish is comparatively slight, but from decomposed fish the danger is great. The prevalence of the disease inland is then probably due to the consumption of a small quantity of highly poisonous fish,

But I must pass on to say a few words about the disease in immigrants. One of my patients was a girl who had been born in the West Indies: her parents had been comfortably situated, and she had suffered no privations of any sort. Another was a boy who had lived some years in India in a comfortable home; I asked his mother if they had much fish at their table, and she answered that they constantly had it, for her husband was exceedingly fond of fish, and added of all the children this boy was the only one who resembled him in this respect. Another patient had been a common soldier: when I asked him if he had eaten much fish, he answered that he ate it whenever he could get it. Another was an officer who had held a command in the Straits Settlements. He said he did not care for fish, but was particularly fond of preserved prawns, and had exceptional opportunities of indulging his taste. I might multiply these examples if I had time.

I know that leprosy has of late years invaded countries where it was not previously known, and that it has spread under conditions which at first sight do not appear favourable for it. Thus it appeared in the Sandwich Islands in 1848, and since then it has invaded California and Australia. It has followed the course of the Chinese: wherever they go the disease appears, and the explanation seems to be that wherever they go they carry their habits with them, and especially that they establish

themselves everywhere as *cooks;* they are skilful cooks, and they can make use of many things which no one else would look at: decomposing fish and potted fish are amongst the delicacies in which they deal.

In conclusion, I can say truly that I shall be quite ready to hear any objections to this theory, and to discuss the subject fairly with anyone. At present I hold that all apparent exceptions can be accounted for, but if anyone can bring stronger evidence against me than I can adduce in support of my argument I shall be quite ready to yield. But I must add that if this hypothesis can be disproved, I know of no other which can take its place.—*The Medical Press and Circular, Aug.* 11, 1880, *p.* 107.

MIDWIFERY,

AND THE DISEASES OF WOMEN AND CHILDREN.

68.—A NOTE ON THE TREATMENT OF SUB-INVOLUTION OF THE UTERUS.

By Dr. James Braithwaite, Lecturer on Diseases of Women and Children at Leeds School of Medicine; Surgeon to the Hospital for Women and Children.

The writer having long felt the want of a perfectly safe and at the same time efficient means of treating uncomplicated sub-involution of the uterus, gladly tried for the first time about two years ago a plan shown him by Dr. Wynn Williams, at the Samaritan Hospital. This treatment is in common use by Dr. Williams amongst the out-patients of that hospital, and in the hands of the writer has been found to deserve all the confidence felt in it by its original author, with whose permission this note, which was at first only intended for a local medical society, is now published.

It may be premised that this treatment is less suitable in cases complicated by endometritis, which should be treated previously for that disease.

The treatment consists in the application to the interior of the uterine cavity of a solution composed of equal parts of iodine, iodide of potassium, and spirits of wine. The first two ingredients dissolve readily in the third.

The patient being in the dorsal position, a Fergusson's speculum inserted, and all mucus wiped away, it is a good plan to pass a sound through the cervical canal, as the iodine application is more readily passed afterwards. The sound used for this purpose should be curved only in its terminal half inch, or a trifle more, and this curve should be of about forty-five degrees angle in order to be easily used through a speculum. A small whalebone bougie, having its slightly bulbous extremity removed, or any long and finely tapering piece of whalebone, is to be wrapped round with cotton wool in its terminal four inches, or to a greater length than that of the enlarged uterine cavity. About two inches of this is saturated with the iodine solution, and is rapidly passed up to the fundus and there allowed to remain for a few moments. To facilitate the rapid

insertion of the whalebone it should be slightly curved towards its extremity, and sufficiently fine to allow of its bending very readily. This is withdrawn in about a minute, the cotton of course coming away upon the whalebone, and being then stripped from it. The effect of the application of this powerful solution of iodine is to cause immediate forcible contraction of the uterine muscular fibre, as may be inferred from the difficulty of passing the cotton a second time soon after its withdrawal. This contraction, however, only occurs when the contractility of the muscular fibre is not lowered by inflammation. As, however, a second application should not be necessary, the contraction passes unnoticed. This solution should be applied twice between the periods, and continued according to the results. The lessening of the size of the uterus is generally marked and rapid, so that on introducing a sound at the end of a week after the first application, a uterus previously measuring three-and-a-half inches may be expected to have lost half an inch of its internal length. Seldom more than three or four applications have been made, and cases chosen which were uncomplicated with much tenderness of the uterus, and unattended with the dirty brownish discharge of endometritis. It is in the experience of the writer a mistake to mix up such cases with sub-involution, and treat them with one remedy, as advised by a late writer upon the use of "iodised phenol." Treat the endometritis first either with ordinary tincture of iodine as recommended by Dr. Tilt, and as was the habit of the late Dr. Tyler Smith, or with carbolic acid after Dr. Playfair's plan, and then if the uterus does not lessen in size as much as desired, use this strong solution of iodine. If this is reversed, the strong iodine will be found to aggravate the inflammation, and the carbolic acid inefficient in curing the sub-involution. The only plan of treatment which seems equally efficient with the one described is that used by Dr. Atthill, of Dublin, the introduction into the uterus of ten grains of solid nitrate of silver. This treatment appears rather heroic, and at this side of the Irish Channel would probably set up unpleasant inflammatory action.

In conclusion, this short article only expresses the experience of its writer, who claims no merit whatever, and who takes this opportunity of thanking the original author of the treatment for a valuable hint in practice, which has helped him over a number of cases which he would otherwise have found it difficult to treat rapidly and successfully, and without fear of doing harm by setting up inflammation, or obliterating the uterine cavity by producing adhesion of its surfaces.—*Obstetrical Journal, June* 15, 1880, *p.* 321.

69.—ON INTRA-UTERINE PUERPERAL COAGULA.

By Dr. J. Matthews Duncan, LL.D., &c.

Puerperal coagula differ from menstrual coagula essentially in the time of their occurrence. Menstrual coagula may occur at any time during the child-bearing period of life, remote from childbirth or abortion. Puerperal coagula occur only in the period called that of the puerperal state, which is easily limited on one side by the childbirth or abortion, uncertainly limited on the other side. This other limit is the period of the return of the uterus to its healthy unimpregnated condition, and into a nice discussion of it I do not enter, satisfying myself by allowing an interval of six weeks from childbirth or abortion to elapse before the puerperal state is probably quite passed.

In describing puerperal coagula, I shall divide them into two kinds—first, those discharged from uteri which have not been dilated to an extraordinary size in order to accommodate them; second, those in which the uteri have become dilated just as they become dilated after contraction in post-partum hemorrhage.

The puerperal coagula which form and are retained in the puerperal uterus not specially dilated vary in size according to the time at which they are formed, being larger of course, the nearer in time to the childbirth or abortion. Hemorrhage may occur while they are retained, without displacing them. They may be discharged entire, or they may break down and pass as brownish débris in lochial fluid.

"A not uncommon cause of secondary uterine hemorrhage," says M'Clintock, "is the retention of a coagulum, or of a portion of the placenta or membranes. A coagulum of any size is not apt to be found in the womb beyond the first few hours after delivery, as a very moderate degree of uterine action would be sufficient to expel it or prevent its formation. Should it occur, however,—and experience abundantly proves that it may,—there will be a constant risk of hemorrhage so long as the clot remains in utero. No doubt, the hemorrhage in these cases is apt to go on continuously after the expulsion of the placenta, even with a tolerably firm contraction of the uterus, as Dr. Ramsbotham has well shown. But on other occasions there is an intermission in the hemorrhage, and it may not come on for hours or days after delivery. Thus, a woman had frequently recurring attacks of hemorrhage during the ten days following delivery, until at length the loss becoming dangerous and her strength much reduced, 'the hand was passed into the vagina, and the fingers introduced into the uterus, by which means some coagula were removed and the discharge ceased' (Collins)."

Of the formation and long retention of a large clot the following case is an example:

Mrs. Y. H., a young recently married lady was confined of twins at the end of the seventh month of pregnancy. Both children soon died. There was a considerable and rather long-continued hemorrhage post-partum, and the uterus was not brought, even at last, to firm, cricket-ball-like hardness of contraction. Her recovery was on the whole satisfactory, but the lochial discharge persisted of red tint. On the 19th, 20th, and 21st days of lying-in there was a considerable secondary hemorrhage, treated by ergot. On the 21st the discharge was chiefly red serum. During these days the uterus was felt to be bulky, but its size was not specially noted. The cervix uteri was patulous, but not open or dilated. On the 22nd day after delivery a large clot came away. It had the shape of the uterine cavity, being rounded in all its outlines and it measured three inches in greatest breadth, and three and a half inches in length from the part corresponding to the internal os uteri. Below this part the clot was soft and broken. It had points indicating the position of the opening of the Fallopian tubes. Over the whole of its lower parts it was partially decolorized in the fretted style well depicted by M'Clintock; and on its upper part corresponding to the fundus the decolorized layer was dense and covering the whole surface. In the fundus of the clot a lacerated aperture was observed which easily admitted the finger, and which was presently accounted for. The bleeding was nearly, but not completely, arrested on the discharge of the clot. Five days afterwards, on re-examination, I discovered a fibrinous polypus and removed it. It had firm adhesion high up in the uterus. Its structure was of the ordinary kind, decolorized on the surface. It was of the size of a chestnut, and had chorionic structures in its pedicle. There could now be no doubt that the hemorrhage flowed around the old clot, which was probably nearly as old as the polypus. It was not so old, for it had been formed around the polypus, and its displacement from the polypus which it surrounded left the lacerated opening in the clot which was observed at the time of the discharge of the latter, but was then thought to be accidental.

In his memoir on polypus of the uterus, Dr. M'Clintock relates a case. "In proof," says he, "that a coagulum may be formed in the uterine cavity soon after parturition, and be retained there for a considerable time before being discharged, I may mention the following case which fell under my notice last spring, when temporarily in charge of the Lying-in Hospital for Mr. Denham. Dr. J. R. Kirkpatrick was good enough to furnish me with the particulars, of which the following outline will suffice :—A young woman was delivered naturally of

her first child February 19. Twenty-four days afterwards there passed from the vagina, without pain or any considerable bloody discharge, a very dense, firm coagulum representing an exact mould or cast, even to the Fallopian orifices, of the uterine cavity. . . . Externally it had a mottled, dark-red and black colour, and towards the centre it was of a lighter shade of red, and not quite so compact in structure. It presented no sign of decomposition. She had not shown any uterine symptoms from the time of delivery."

In the two cases just given, the intra-uterine puerperal clots were old and partially decolorized, not putrid. A case is referred to by M'Clintock, as narrated by Lachapelle, which, although not quite satisfactory in its details, seems to show that such clots may, instead of growing hard and decolorized, become putrid. "Another interesting remark," says Lachapelle, "which this observation may furnish us, is the return of the hemorrhage at so late a period, without our being able to attribute it to any other cause than the presence of two somewhat voluminous clots, whose fetidity proved their age." The patient had been delivered, at the full time, of twins. The labour was tedious. The membranes were ruptured after about twenty hours of pains, and the first child was soon born. The second soon followed, and then a bilobed placenta. Severe hemorrhage followed and continued for five hours, uterine inertia being at last dispelled by injections of cold water. The woman did well till the eighth day, when she got up, and then a little blood flowed. Hemorrhage continued, although the woman was put to bed, till two fetid clots were discharged. The woman was taken with shiverings, vomiting, fever, &c., and died the following day.

In cases of ordinary secondary hemorrhage it is not rare to find the uterus relaxed and full of soft clots; and it is often recommended, and practised, to remove these clots, in order to facilitate or secure uterine contraction and retraction. Examples of this are not rare in practice. Sometimes such cases are fatal, and then the clots, often adherent, may be observed in autopsy. Cases are related by Collins, Ingleby, Ashwell, M'Clintock, and several references may be found in my paper on the introduction of the carbolized hand into the uterus at long periods after delivery. All such cases are regarded justly as rather cases of hemorrhage than of clots, just as in the analogous post-partum hemorrhage.

There is another class of cases of great importance, mention of which cannot be omitted, where, in consequence of the retention in utero of some adherent ovuline structure, the involution of the uterus is retarded in a remarkable degree, or completely arrested, till the adherent mass is removed, and

then involution again makes progress. Of such occurrences I have recently seen several striking examples, where the still retained mass was very small, not bigger than a small hazel-nut, yet where involution was arrested for weeks or months, and when hemorrhage had proved almost fatal. In such I have removed firm, old, but not decolorized clots. Such clots do not interfere with the hemorrhage, seeming, indeed, to encourage it; and they are often discharged with more or less pain, new ones being formed in the place of the former. I shall not relate the particulars of any such case, but only refer to one which I published lately.

I cannot advance to the subject of fibrinous polypus without making special remarks on a case of M'Clintock's which he, indeed, calls a fibrinous polypus, but which cannot be regarded as truly such. For he describes the tumour as "not seeming to have any attachment to the uterus, but simply retained by the constriction of the os." The case, then, is very rare, if not unique, and deserves quotation at length, being an unattached decolorized puerperal clot resembling a fibrinous polypus, except that it was unattached and contained no ovuline structure. It is right to note M'Clintock's tone of caution, which justifies the remark that the case is not quite conclusive as it stands. "A married woman, aged thirty-five years, applied at the Lying-in Hospital Dispensary, in the month of September 1861, on account of frequently recurring bloody discharges from the vagina. These had been going on for three months, but were at no time very profuse in quantity. On making an internal examination I found the os uteri open, and a soft fleshy substance, which had all the feel of an ovum, protruding from it. With the aid of a volsellum I drew it away. This was effected without the use of force, the tumour not seeming to have any attachment to the uterus, but simply retained by the constriction of the os. The body so removed was totally devoid of fœtor, and was about the size of a large hen egg, but more elongated, and pointed at the ends. It was tolerably firm, but could be cut with a blunt instrument such as a spatula. Its exterior was of a reddish-yellow colour, and within it was apparently composed of coagulated blood. It contained no vestige of a distinct membrane, nor any structure properly belonging to the ovum. This woman had had an abortion or a premature labour (I forget which) about four months previously."

Into the whole subject of true fibrinous polypus I do not propose to enter. Many such cases have come under my observation. They all occurred in connection with recent pregnancy, and were the cause of continued loss of blood, sometimes copious, sometimes inconsiderable. They were all easily cured

by removal of the polypus. In all there were ovuline structures in the pedicle or near the attachment of the mass. In most the shape was polypus-like, and the body of the polypus lay in the dilated cervix uteri. In one, already related in this paper, the polypus was within the body of the uterus. In one case the polypus had not the shape of a pear, but was largest at its broad insertion, smallest at its intra-cervical portion; it followed an abortion, and was recent, being scarcely decolorized on its external surface.

In his original writing on fibrinous polypus, Kiwisch, as is well known, thought it probable that the uterus was relaxed, and enlarged or dilated, in order to contain it. His view has been generally rejected, and it is to be remembered that he was writing the first lines penned on the subject, and in ignorance that such polypi was observed only in women who had recently been pregnant. Dilatation of the uterus will be admitted to be easier, and therefore more probable. in a uterus which has recently been pregnant than one not in the puerperal or lately emptied condition; and I know no good reason for positively denying that such dilatation of the cavity of the body of the uterus ever takes place.

But it is important to remark that we have no clinical evidence that, in order to contain a fibrinous polypus, the cavity of the body of the uterus undergoes special dilatation. It is, indeed, in consequence of its recent repletion in pregnancy, already in a dilated condition. The structure of such polypi and their history show that they are generally, if not invariably, formed of one attached clot, which shrinks and hardens as it undergoes decolorization, and is generally expelled from the cavity of the uterus proper and lodged in that of the cervix, so far as its body is concerned, while its stalk in the proper uterine cavity maintains the connection of the body of the polypus with its attachment.

I come now to consider the second class of cases, in which the proper uterine cavity is enlarged or dilated, and that probably very rapidly, in order to contain and retain the puerperal clots.

Rapid enlargement of the uterine cavity is well known as a not rare occurrence soon after parturition. This enlargement is too rapid for growth of tissue to have any part in its production. Growth of tissue goes on in regulated concurrence with the expansion of pregnancy; and even in morbidly rapid or extreme expansions there is at least time for growth of tissue to aid in the expansion. Of extreme expansion, often with thinness of wall, examples are found in the hydramnios of advanced pregnancy, and in some cases of uterine hydatids, where it may occur to a marvellous degree either in early or late periods of the gravid condition. But of such expansion as

we here consider better illustrations are found in the (too few) post-mortem experiments of Glenard, and in the cases of introduction of the hand into the uterus at long periods after delivery.

Ingleby mentions that a case "in which so late as the nineteenth day after delivery the uterus was emptied of a large quantity of putrid blood, shows its capability of distension at this remote period." In my own practice a well-observed case occurred, in which the sudden dilatation with formation of intra-uterine clots occurred on the ninth day after delivery. Mrs. S., a healthy young woman, was attended by me in 1862 in her first confinement. It was easy and natural. Eight days after her confinement, while she was making a satisfactory recovery, she was seized with faintness and a free discharge of blood. When I reached her, I found the uterus enlarged to about the size of a four months' pregnancy, its fundus rising above the pubes to fully half-way towards the navel. It was by kneading made to contract and expel large firm clots. Ergot and pressure maintained the contraction. When reduced in size, the uterus did not feel more bulky than it would be expected to be on the ninth day. It is a curious fact that this woman, delivered on Dec. 3, was again delivered on Sept. 29 of a mature, well-developed child, which came into the world a fortnight earlier than the day calculated for by the doctor in attendance. She had had within four weeks after delivery what she described as a scanty anticipatory menstrual flow.

The cases of relaxation and dilatation of the uterus in the puerperal state, when there has been no retention of ovuline structures, which have come within my observation or reading, have been cases of hemorrhage rather than of puerperal clots. In Ingleby's case, where the clots were fetid, there is evidence of retention of clot for a considerable time; but I know no case where the decolorization of the clot indicated length of retention in utero. But there is no apparent reason why such an occurrence may not take place; and M'Clintock's case of so-called fibrinous polypus is the nearest approach to its realization. It would, indeed, be a case in point were there any evidence that the uterus had been expanded to contain the decolorized clot which he removed.—*Obstetrical Journal*, *June* 15, 1880, *p.* 367.

70.—ON PUERPERAL FEVER.

By Dr. J. Matthews Duncan, LL.D., Physician-Accoucheur and Lecturer on Midwifery, at St. Bartholomew's Hospital.

Sepsin, or chemical products of decomposition dissolved in water are absorbed by the extensive mucous surfaces of the

vagina and uterus, with their lymphatics, and by the placental and other wounds in the genital tract. Or they pass freely into the uterine sinuses and thus into the general circulation. The result is quick pulse and respiration, high temperature, delirium, and often purging. If the poisoning is slight, symptoms are slight. If the poisoning is by a large dose the symptoms are urgent, and death may result, and this without any added septicæmia to produce the fatal event.

During the currency of the disease or poisoning there is the possibility of a cure, almost sudden, by removing the fetor or stopping the supply of the poison. Nothing is more striking or more gratifying in the whole practice of medicine than this sudden recovery; and, as it is often produced by art, it deserves the name of a cure. A patient in the most alarming condition, apparently within a few hours of death, is appropriately treated, and within a few hours alarm has entirely subsided. It is not in lying-in women alone that such cases are seen; but sapræmia is more frequently observed in them than in others, and the joy of recovery is greater because the foreseen danger is greater, for evident reasons.

An aggravated case of this kind was recently under my care in St. Bartholomew's Hospital, and I shall give you a sketch of it from the notes of Mr. Nall. The largeness of the retained placental mass made the cause of the disease evident and easily discovered; and in this respect it is not like the run of similar cases which are classed under the designation puerperal fever. The recovery in it was so great, so quick, and so nearly complete, as to be scarcely credible. The woman appeared to be at the point of death. It was apparently not worth while to disturb her by treatment. In a few hours after the treatment she was comfortable, and every alarming symptom had disappeared. Yet for some days there was slight recurrence of fetor and persistence of diminished symptoms, but not to such a degree as to cause any suffering or alarm for the ultimate safety of the patient. Were the case not a typical one I should not take up your time with it.

A. E. was delivered naturally of her second child on June 8. Flooding occurred after the birth of the child, and slight blood loss continued for seven days. Then the lochia became fetid. On the eighth day she had rigors, which were repeated daily. She was brought into the hospital on the tenth day, and was delirious during the night. On the eleventh day of her lying-in, when I first saw her, she had no complaint of pain, was pale, sick, frequently vomiting, troubled with diarrhœa; the uterus tender; breath sweet; respiration hurried, 44; pulse 146; temperature 104·2°; copious flow of stinking lochia. A piece of placenta was removed from the vagina. Under the influence

of chloroform the hand was introduced into the uterus, which was soft and easily admitted it, and adherent placental masses were removed, some small shreds being left after many had been separated by volsella. The whole genital tract was then washed out by copious injections of carbolic lotion (1 in 30). Ergot of rye was administered, and the uterus was washed out every four hours during the day. The report of the next day bears that she had a good night without delirium, that the bowels had been twice moved, the motions being thin, yellow, and offensive. The discharge was slight and slightly fetid; the breasts were tender and swollen; the pulse had fallen to 100, the respirations to 36, and the highest temperature was 101·4°. The whole aspect of the case had changed from despair to hopefulness. Ergot was continued for some days, and the carbolic washings as long as any trace of fetor was found. Recovery was uninterrupted; indeed, it may be said there was no process of recovery, there was only convalescence. Such a progress is not seen in any other form of puerperal fever. The theory of sapræmia accounts for the rapid cure, while the theory of the other forms of puerperal fever explains their gradual advance from bad to worse, or to recovery.

Sapræmia is treated earnestly, even heroically if necessary, with a view to its own cure, and with a view to the prevention of the complications, inflammatory, septicæmic, or pyæmic, which it is very likely to bring in its train. Heroic treatment may be required to reach the remotest part of the genital tract in search for decomposing matter, or to ascertain that there is nothing but putrid lochia in the case. Mere vaginal washing may suffice, or intra-uterine washing, or the volsella may be passed into the uterus to grope for the decomposing structure, or with the same view a finger or fingers may be passed, or even the whole hand; and it may be necessary to dilate the cervix preliminarily. Most of this may be done without an anæsthetic, but where the hand is to be introduced into the vagina, the previous induction of anæsthesia is desirable.

The lotion which I always use is the carbolic, of the strength of 1 in 40, or occasionally 1 in 30. It is used tepid or warm. In conducting the operation it is necessary to be very gentle, to avoid the introduction of air into the passages, and to see that the fluid runs out freely. If the os uteri externum and internum are not widely open, a pipe with double current should be used. The whole proceeding should cause little or no pain, and, for an ordinary washing, a pint or a pint and a half may be passed. But if the discharges are copious and fetid, more may be required, and the rule is to continue the injection so long as it comes away foul or perceptibly fetid. Of course, a bowl is to be so used as to receive all the lotion as it is dis-

charged, in order to save the bed-linen from being wetted. When the uterus is washed out the medical attendant conducts the operation, but vaginal washings may be left to the nurse. The washings are to be repeated from twice to four times a day if the fetor persists in the discharges. After the fetor is suppressed twice a day is sufficient. If the discharges become natural, and if the symptoms of sapræmia disappear, the washings are stopped. In any case they are required only for a few days.

These antiseptic washings constitute the great or essential treatment of sapræmia—a treatment, as already said, so direct in its action, and so successful, that it may be called a cure. Though these washings have been described by ancient authors, and though they were recommended by Harvey and by Baudelocque, it is well known to you that no such practice was in use among us till the antiseptic theory of treatment was promulgated. Yet they are not covered by the antiseptic theory, for you know it was based on the presence of bacteria which passed into the blood, and the antiseptic treatment was planned to destroy them or prevent them reaching the wounded surface. Here we use antiseptics not with these views, but to remove and arrest putrefaction, with a view to stopping the supply of a chemical, not a living, poison, the product of putrefaction, which enters the blood and endangers the constitution.

Besides the washings out, a case may demand many attentions, and cares too varied and too uncertain of occurrence for me to enter on them here. But to one I must allude as probably directly useful. It is the administration of ergot. A drachm of the liquid extract, in divided doses, should be given daily for a few days. The object of its use is to induce permanent contraction of the uterus or uterine retraction. This diminishes the uterine cavity, in which the discharge accumulates; it thus also lessens the surface absorbing the putrid poison, and the contraction of the walls of the organ may to some extent prevent the passage of the fetid fluid along the vessels into the circulation. Of course, should it be desirable, the drug may be given hypodermically, ergotin being used instead of the liquid extract.

Perhaps I have made the pathology of sapræmia too simple; for, in addition to what I have said, it is necessary to add that fetid lochia do not always poison the constitution. They generally do so, but not invariably. They may flow in intense putridity, and yet be apparently not absorbed, as is generally the case. Why the putrid ichor is in some cases not absorbed I shall not here attempt to explain.

I know no reason why septicæmia and pyæmia should be called *real* puerperal fever, yet this is a common mode of speak-

ing. The simple inflammatory fever, and the sapræmic fever, are not less really fever, nor less really puerperal. Probably the notion arises from the fact that grave cases of fever after delivery are for the most part septicæmic, or pyæmic, and that the great majority of the deaths in childbed is produced by these diseases. There has always, indeed, been a tendency to regard puerperal fever as desperate, or almost certainly fatal. I can remember well the saying of an eminent physician, with whose retrospective diagnosis many agreed, that if a case recovered it was not one of real puerperal fever. Probably he did not mean his words to be held as strictly true, but to express his sense of the hopelessness of such cases. This disheartening opinion should not be entertained, for it is not based on ascertained truth, and it induces despondency and feebleness in treatment which are prejudicial to the thorough management of a case. The pyæmic cases with their embolism, inflammation, and abscess, are more dangerous than the septicæmic, but even in pyæmia there are numerous recoveries. Every one has heard of rare and marvellous convalescence in pyæmia, even after several joints have suppurated; but these are very far from being the only instances. Many less severe cases survive the disease.

I may consider simultaneously the treatment of these two diseases. They are often combined, and their treatment is identical, if we except such surgical interference as is sometimes required in cases of pyæmia, a department into which I do not propose to enter. I have said that pyæmia and septicæmia may be combined, and while this is probably a frequent occurrence, it should also be remembered that all the forms of puerperal fever may be simultaneously present in one case. The separate consideration of simple inflammatory fever and of sapræmia is demanded by their utterly different pathology, and by their distinct indications of treatment. For the inflammatory fever we have some modification of the venerable established antiphlogistic method. For the sapræmia we have the arrestment of the putrid poisoning. For the septicæmia and pyæmia we have no treatment in any sense antidotal or curative in the humblest meaning of that word.

Cases of pyæmia and septicæmia are to be managed rather than treated. The word treatment implies too high an estimate of the physician's powers; or if not too high, at least a too definite view of them. We cannot arrest or even moderate the storm, but we may guide the bark through it. When the organisms producing these diseases are in the blood we cannot kill them, nor do we know any means of certainly controlling their growth. But we may wisely consider the constitutional and local circumstances of the patient, and judiciously interfere to modify them with a view to the patient's survival.

One unsound tree in a forest may be covered with lichen and fungus, and the tree may slowly die, or be killed. But it may survive, and becoming healthy, throw off the morbid growth which endangered it. The organisms of pyæmia and septicæmia find a favourable nidus for development in the weak, the unhealthy, the hopeless, the ashamed, the sad—in those who have been exhausted by a long labour or injured in the course of a severe one. But the attacked do not certainly die. The organisms may grow and grow, and cause death, but they are not necessarily fatal; their growth may be arrested, and they may all disappear. Debilitating and depressing conditions favour their development. Health and strength favour their disappearance. These principles are the foundation of our management; and experience, daily increasing, confirms the conviction that the foundation is not laid on sand.

Good nursing, careful feeding, prudent stimulation—these are the great points. In all of them there is now progressive improvement. While it is impossible to appreciate with any exactness what we owe to these, no one will deny the comparatively great advantages we now gain by them. It would be out of place to enter upon the subject of nursing here. It is no peculiarity of cases of septicæmia and pyæmia to require good nursing, and the subject is specially referred to in connection with these diseases because, in default of any direct treatment, we specially consider what remains for us to attend to.

On feeding and the use of stimulants I might content myself by making the same remarks as on nursing; but I wish to insist on the great necessity for more attention being paid to the niceties of these important departments. The food and drink should not be left altogether to the nurse. In quality, quantity, and time they should be regulated; and this cannot be done by previously fixed rules, but by directions modified according to the observations daily or hourly made in each individual case. Milk and beef-tea are the staple of the patient's diet, and they may be varied almost infinitely, to suit minor emergencies as they arise. In regard to food, the general rule is to give as much as the patient can take without evident disorder arising from it. It is seldom that too much is taken, for a common difficulty lies in overcoming the aversion to food.

The use of stimulants requires a little more discussion. At present the favourites are brandy and champagne, and I adhere to the general voice in preferring them—on one condition, that they be really good. At the same time I make no objection to other wines and spirits. Brandy and champagne are common and simple, and, for me at least, it would be only an affectation of refinement to appraise the merits of different wines

and different vintages. But I am sure that, in regard to all stimulants, our aim should be to use as little as possible. Often, at least for a time, none at all is required. Occasionally, but rarely, in a crisis of weakness, brandy is to be administered largely. Always the principle holds good that too much will do more harm than too little. I am sure that it is a common error to give too much. Excess of food may be passed along the primæ viæ without entailing any considerable injury; not so excess of alcohol. Food is rarely desired by the patient, while she often wishes alcohol; because, as it is given, it assuages thirst for a time and produces at once an agreeable excitement.

A sketch of the treatment of septicæmia and pyæmia would be bald and imperfect if it were confined to the paramount matters—nursing, food, and stimulants. Great attention has to be paid to the general condition and to the state of health as indicated by prominent symptoms. Iron and quinine are now frequently administered, and with great advantage; and what a change of view does this imply if we look back to the days of Gordon or even of Ferguson? I can well remember the astonishment and unsettlement of mind produced by the recommendation of Hamilton Bell to use the old tincture of the muriate of iron in erysipelas, and I frequently witnessed the earliest employment of the same remedy in the cognate diseases now under discussion, chiefly by the advice of the elder Begbie. It was always the custom to combine bitters with the iron, but now the regal bitter, quinine, is used, not only as a stomachic vehicle, but with the direct purpose of reducing the temperature whose regular observation helps so greatly to guide us now—a chart unknown in the days of Bell and Begbie. Besides quinine and salicin, the influence of cold is now familiarly resorted to to reduce temperature when it rises above 102° or 103°, and this is done with the result of giving comfort and securing probably real gain. Many physicians, Schrœder, Osterloh, and Spiegelberg, in Germany, and especially Playfair in this country, have used the cold bath to reduce temperature when it is very high; but I have no experience with it. Temperature does not long remain high in this disease, varying greatly and often rapidly and for keeping it moderate, quinine or salicin, in large doses, with regulation of the heat of the room, of the bedclothes, and of tepid sponging, are generally sufficient.

Ice is often taken internally against thirst, and it is a delicious mouthful; but the craving thirst is not relieved. The dose is repeated and repeated in vain. For the relief of thirst, the old remedies, such as toast-water, have more real value. But the urgency of thirst is minimised by the proper management of the case. At least, I can have no doubt that in the days of

what I call the excessive use of wine or brandy, or of opium, we heard a deal more of the suffering from thirst than we do now.

Ice is much used to arrest vomiting, which is so common a symptom of the peritonitis of puerperal patients, and it is sometimes effectual. For this distressing symptom remedies are numerous, and their largeness of number is evidence of their uncertain action. The best is of course that most used—the hydrocyanic acid and bismuth mixture, without or with morphia.

With or without sickness and vomiting there may be flatulence, and it is sometimes so great as to embarrass the heart and lungs. In extreme cases relief has been afforded by letting off the air by a small trocar and canula, but of this proceeding I have little experience. The remedies which I have found of most use are charcoal in teaspoonful doses, given in water once or twice daily; or turpentine, in ten-drop doses, given in water or some simple vehicle, three or four times daily.

The hot linseed-meal poultice is almost always a grateful and useful application to the hypogastric region, relieving pain and promoting the lochial flow. Besides, when the skin is hot and dry it is a valuable diaphoretic.

Opium in some form is invariably administered, and almost always with advantage. Occasionally, indeed, it produces great mental disturbance and uneasiness, or vomiting, or dryness of tongue; and, in such cases, if a change of the preparation does not bring better results, the medicine may have to be given up, or used only to produce sleep. Indeed, apart from any injurious effects, it is often a good plan, when pain is not urgent, to give it only to secure a good night. But generally it is given repeatedly during the day, either to relieve pain or with a view to its soothing and supporting rather than narcotising action.

Opium and other remedies are also often used against diarrhœa, and in this way much good may be done. But it is necessary to pay much attention to this purging, generally of thin highly coloured dejecta, for undoubtedly it should be encouraged rather than checked; and perhaps fortunately, it is often not easy to check it. The physician should see all the motions, so as to justly estimate their quantity and character, and he should not regard it as his duty to try to check free and even copious evacuations, or to get the stools in a formed state. He will be guided in his judgment on this point by the strength of the patient and the amount of food consumed.

During the whole course of the disease the regular flow of the lochia is anxiously looked for; and should they be suppressed, an attempt is made to bring them back by hot fomentations to the vulva and hypogastrium; for it is naturally regarded as

desirable that there should be lochial discharge, and that it should not be retained. But besides its mere flow, the character of the discharge, especially as to fetor, is scrutinised. If there is fetor there is probably sapræmia complicating the septicæmia or pyæmia, and this fetor is treated by antiseptic lotions, as already described. But fetor of discharges forms no part of septicæmia or pyæmia. The bacteria or micrococci of these diseases flourish when there is no fetor. At present, however, such is the enthusiasm for antiseptics, that it is considered desirable to have the womb well washed out once or twice daily by carbolic lotion, even when there is no fetor; and meantime I consider it good practice to do this twice daily while there is urgency, if the discharges are not quite healthy in all respects. The intra-uterine washing cannot work upon the infected blood circulating everywhere in the body, and carrying with it the baneful organisms, but it can keep the wounds clean; and, if the womb or vagina is a nursing-ground for farther supplies of these organisms, then by the antiseptic washing the nursery is destroyed. The farther supply of the contagium vivum is stopped, for the micrococci are killed by the carbolic wash.

Such is an outline of the treatment of a group of terrible diseases.—*Lancet, Nov.* 6, 1880, *p.* 721.

71.—ON THE USE OF THE FORCEPS.

By Dr. G. Hamilton, Falkirk.

When there is a prospect of the forceps being required, I find, as Dr. Bell said in one of the discussions at the Edinburgh Obstetrical Society, that the fœtal head has entered the pelvis *mostly* transversely, and I generally do not trouble myself much more than to ascertain where an ear is in relation to the symphysis, and whether the face is turned to the right or to the left side. If the ear is to the right of the symphysis, and the face is also to the right, I know I have a favourable position, because *if the head turn* it will not encounter the rectum; while, on the contrary, if the ear is on the left side of the symphysis, with the face to the right side, the case is not so favourable, because, probably, the head will revolve to the left, and the face pass towards the pubes; while, again, if the face is to the left, and the ear near the symphysis, the revolution will probably be to the left, and unfavourable, because in doing so the face will encounter the rectum. But really I do not care much about the exact position the head occupies, for I find practically that with my powerful forceps, I can modify the position greatly, and especially that I can throw the head back and make it revolve round the pubes without making any lateral revolution at all, or, in other words without the face passing into the hollow of the

sacrum; and that this, indeed, is a usual way in which my deliveries take place.

Although I have said that I don't care where I catch hold of the head when it is at the brim, my practice almost always is, when the head is more advanced, or is what has very properly been called intra-pelvic, to follow the rule of Smellie and Burns, and apply the first blade of the forceps over an ear. Now, I wish particularly to direct attention to the consequences which I say *necessarily* follow from being guided by this rule, and also by the one I have previously enunciated as to the second stage of labour not being allowed to continue much more than two hours; for, I say, the practitioner who does so will be all but *compelled* to follow my obstetric practice in what have been considered its two chief peculiarities, viz., a frequent use of the forceps, and using these antero-posteriorly. Let me take, 1st, the rule as to the second stage of labour, and say that the practitioner resolves to act up to it. Well, I say that if he does so he will, in a vast proportion of the cases, find, where the head is intra-pelvic, that an ear will be found, as I have often said, "at or near the symphysis pubis." So large is this proportion, that, excepting where the face presented, I would classify my 202 forceps cases thus: 2 to 4 per cent. at the brim; 1 to 2 per cent. with the head or face in the hollow of the sacrum; and nearly all the rest with an ear at or near the symphysis pubis. But again, if I am correct in this, how can I do otherwise than apply my forceps antero-posteriorly? My forceps are straight; but even Smellie's double-curved forceps were applied in this way, as is seen in his plates; and all the slightly curved modern forceps *must* be applied nearly antero-posteriorly if these two rules be attended to. On a former occasion I said that I had not delivered a case with the forceps for fifteen years where the face had turned into the hollow of the sacrum, and then only in assisting a midwife, and the reason obviously was, again, because my first rule made me anticipate this portion of a natural but retarded labour. Curiously enough, since I said this, two of my forceps cases (both in my last series) have had the face in the hollow of the sacrum, and I found that these were not quite so easily managed *with my instrument* as when the ear was at the symphysis, principally because I had to get the patient more over the side of the bed than I usually do in order to reach the ear. This probably is the reason why the old (and a good many modern) practioners have preferred the short double-curved forceps, and liked also to deliver with the patient on her back—regarding which I shall have something to say immediately.

From all that has been said, it will be seen that somewhere about 96 per cent. of my forceps cases have been of the sim-

plest possible character, at least as I usually treat them; and I cannot also help saying that the house surgeon in a maternity who cannot treat them is not in his proper place. In fact, I think it right that it should be said that, if lives are to be lost at our maternities because the cases occurred during the night, and it was thought inconvenient to rouse the principal physician, or because he had been otherwise engaged in private practice, the whole matter will come some day to be unpleasantly ventilated in our newspapers. I beg respectfully to bring this point specially under the notice of the gentlemen who are managers of maternity hospitals. Great improvements in midwifery practice have taken place in the last fifty years, and maternities must keep abreast of these or fall into disrepute.

As to my mode of applying the forceps, or as to the instrument which I use, nothing more, I think, need be said at present, as these have repeatedly been already described, and the forceps can at any time be seen at Mr. Young's, surgical instrument maker in Edinburgh.—*Edinburgh Medical Journal, Nov.* 1880, *p.* 420.

72.—A CASE OF SPONTANEOUS EXPULSION OF LARGE UTERINE FIBROIDS.

By H. W. Jackson, Esq., M.R.C.S.Eng., Lewisham.

Late in the evening of March 19, 1880, I was called to M. A. G., aged forty-two, who had had one child about eighteen years ago. She was very thin and pale, almost pulseless from hemorrhage, and was suffering from severe paroxysmal pains, which she described as "exactly like labour pains." She had had the pains with but little intermission for nearly four days. Blood was then oozing from the vagina, and the patient stated that for some years she had been subject to much loss and suffering at each monthly period.

On examining the abdomen externally, the uterus was found to be as large as it is in the eighth month of pregnancy; it was firm and hard, and a little to the left of the middle line. On passing the finger into the vagina, a hard, round, pear-shaped tumour, or polypus, was discovered, which filled the whole of the cavity, and pressed with considerable force upon the outlet. With each uterine pain it came still lower. It was so bulky that I could not feel its insertion into the uterus, and I was unable to determine to my own satisfaction its diameter at the most distant point I was able to reach with my finger. It was covered with loose mucous membrane, which was doubtless the lining membrane of the uterus.

I gathered from the patient that she attributed the affection to a kick on the abdomen, by a little child, eight years ago.

At all events from this date she began to feel uneasiness, or pain, in the womb. Six years ago she suffered from vomiting, which was occasionally very severe, and which no medicine seemed to be able to control. The vomiting occurred "off and on" for many months. At the same time she began to suffer from hemorrhage and dysmenorrhœa, and these had continued with gradually increasing severity ever since. Three years ago she went to the London Hospital as an in-patient under Dr. Herman; and she remained under his care for about fourteen weeks. At that time she had an uterine tumour which reached to within half an inch of the umbilicus, and which was ascertained (by exploration after dilatation of the cervix) to be a large soft fibroid, "springing from the posterior wall of the uterus, rather more to the right than to the left: its base being so broad as to form its greatest diameter." She was treated by ergot, administered by the stomach, without any appreciable benefit, and then by dilatation of the cervix, and the application of tincture of iodine to the interior of the uterus: this latter measure seeming to diminish the discharge. The case was published by Dr. Herman as one of a series illustrating the effect of ergot upon uterine fibroids, in the Medical Times and Gazette, vol. ii. 1879, p. 98, where further details as to her then condition will be found. Sometime during last autumn she again went to the hospital for a few hours, but as she was unable, from fatigue, to remain in the out-patients' room, she came away (as I understood) without seeing the doctor.

For the oozing of blood I ordered cold wet cloths to be applied to the vulva, and for the pain I gave ℥xlv of Howlett's solution of purified opium, and advised ℥xx to be repeated every half hour until the pain abated.

Next day the patient looked better; there was no further loss of blood; and the occasional twinges of pain were readily kept under by small doses of the opium.

On the afternoon of the following day the tumour appeared to be softening and breaking up. It was offensive, and I ordered an injection of sanitas every two hours. I made arrangements for Dr. Fisher to see her with me on the following day, in order that I might, with his assistance, remove as much of the tumour as could be readily got at.

On the 22nd, Dr. Fisher kindly saw the patient with me. A large mass of the tumour was hanging down from the vagina, and I succeeded in cutting away, with a pair of scissors, a piece very considerably larger than my fist. It was dragging down the womb and distending the vulva, and the suffering which resulted was distressing to witness. With the removal of the portion referred to, the pain ceased and the patient felt comparatively comfortable. The sanitas injection was con-

tinued every two hours, night and day, and the patient seemed pleased with its detergent effect. Next day the residue of the tumour was found to be disintegrating rapidly, and large portions came away with each injection.

On the 24th (two days afterwards) the patient complained that she once more had the "labour pains," and she begged for some more opium. I supplied her with some pills containing one grain of opium, and advised her to take one every four hours so long as the pain was severe.

On the 25th there was no particular change; the patient was still taking an opium pill occasionally.

On the 27th, after much pain during the night, a second tumour was extruded from the uterus. It was apparently in every respect similar to the first.

Next day, Dr. Fisher not being at home, Mr. Bowen kindly saw the patient with me, and by means of the wire écraseur, I cut away a portion nearly half the size of a cricket-ball. The removal of this mass gave relief, as the pressure on the anterior part of the vagina was thereby much diminished. I had now room to pass the wire well down towards the pedicle of the tumour, and I succeeded in getting well hold of a very large piece. Unfortunately, in screwing the wire home it broke, and I had to defer proceedings until I could get another wire.

Two days afterwards (on the 30th), as I had to attend a delicate lady in her confinement, I considered it inadvisable that I should pass my fingers into the decomposing mass. Dr. Fisher, therefore, with the assistance of Mr. Bowen, was kind enough to remove a second portion of the second tumour. The piece was quite as large as a cricket-ball, but Dr. Fisher was unable to get it through the vaginal opening. A dilute solution of the permanganate of potass was used after this day as an injection.

Next day the excised portion of the tumour was passed spontaneously, and I saw it. It was quite as large as a cricket-ball, and the cut surface of that portion of the tumour which remained attached to the womb could be easily felt and recognized.

On April 1st large quantities of débris came away every time the syringe was used; and in the afternoon I washed out the vagina myself, and cleared it so completely that no portion of tumour could be detected in the passage.

On the 2nd of April, after a recurrence of uterine action and pain, the vagina was once more completely occupied by a tumour quite as large as either of its predecessors. But it was evidently softening; it broke up readily under the finger, and I removed the greater portion of it with a uterine forceps. The patient bore up well, and was quite cheerful. She took nourishment readily. The abdominal swelling had now disap-

peared, and the uterus had so diminished that it felt like, and was quite as small as, a well-contracted uterus after delivery.

On the 4th there were symptoms of blood-poisoning; the patient had been slightly delirious during the night; there was diarrhœa, there was thrombus of the left external iliac and femoral veins with swelling of the left lower extremity, there was a cadaverous appearance of the face and of the body, and the pulse was frequent, feeble, and small. The vagina still contained some broken-up tumour, and I syringed and brought away a quantity of very fœtid stuff.

Some of the dead tissue continued to come away daily, so that it was necessary to keep up the injection with permanganate solution; and this course was persevered in until the patient's death on the 8th of April.

No post-mortem examination was made.

How came it to pass that these three dead tumours were expelled one after the other within so short a period? Had they reached the natural term of their life, or had they been killed by the violent action of the uterus, which had been going on during the three or four days preceding that of my first visit? I believe the latter to be the more satisfactory explanation. Long-continued expulsive efforts would be likely to arrest the circulation of the blood in the tumours; and their death and subsequent extrusion would follow as a matter of course. Had the tumours been living when passed into the vagina, they might have been removed by the écraseur, and the termination of the case might have been a happier one.—*Obstetrical Journal, July* 15, 1880, *p.* 394.

73.—RUPTURE OF UTERUS—PROBABLY IN ATTEMPTS TO REMOVE AN ADHERENT PLACENTA.

By J. Bain Sincock, Esq., M.R.C.S.Eng., L.S.A.Lond.

On the 5th of June, 1880, I was called to S. C., æt. twenty-nine, who was then in labour with her first child.

I found the patient walking about the room, the pulse fair, the woman cheerful. On examination per vaginam, the os was dilated to about the size of a sixpence, and the head presenting. The pains were moderate, and coming on every ten or twelve minutes. I instructed the midwife in attendance to send for me when the os was fully dilated.

I was called again at 5 p.m., and found the woman had been delivered of a female child two hours previously. The nurse sent for me because she had been unable to remove the after-birth. (I found afterwards she had attempted its removal by passing the hand into the uterus). At the time of my visit, the patient was pulseless, and her countenance expressive of anxiety.

I ascribed her condition to exhaustion, knowing that for some weeks she had had a very scanty supply of food. No hemorrhage of any consequence had occurred. On placing the hand over the uterus, I found that organ contracted with a moderate degree of firmness, but my attention was at once attracted to a small tumour situated immediately over, and slightly to the left of, the fundus uteri, and firmly connected with that organ. With the finger in the vagina the placenta could be felt, but moderate traction on the cord produced no effect. Seeing the woman was in such a low condition, and that the hemorrhage was very slight, I decided on waiting a little longer before introducing the hand into the uterus. I ordered ergot and ammonia in small doses frequently repeated.

At 7.30 p.m. the patient had rallied a little; pulse hardly perceptible. After-birth as before. Rather strong traction on the cord proving of no avail, I passed the hand into the womb, and found the placenta firmly adherent to the anterior wall, close up to the fundus. In searching for the upper placental edge, I found the index finger was in what I took to be the narrow portion of an "hour-glass contraction," but with the left hand over the abdomen I could distinctly feel the tip of the right index finger. I then for the first time recognized the true condition; the finger was clearly through the uterine tissues, and in the abdominal cavity. I estimated the rent to measure about an inch and a half in length. A portion of the placenta had been protruded through the uterine wall, and that gave rise to the small tumour that had previously attracted my attention. Finding I could not peel off the adherent placenta by using moderate force, I withdrew the hand.

June 6, 10 a.m. The patient has had a restless night; slept a little towards morning; constantly sick during the night; unable to keep anything on the stomach. She is now more cheerful; pulse very weak; complained of pain when the abdomen was examined; the small tumor over the uterus could not be felt. Placenta still adherent.

She felt quite comfortable up to about 5 p.m. when she wished to be turned on her side, immediately after doing so, she died.

Post-mortem examination eighteen hours after death.—Body fairly nourished, rigor mortis present. On opening the abdominal cavity, the intestines were found unusually empty; there was no blood beyond a slight stain on the fundus uteri. The uterus was removed entire. The rupture was found to be situated half an inch above, and to the right of, the insertion of the left Fallopian tube, and running almost directly across the fundus. The rent, which included the peritoneal covering, measured three-quarters of an inch in length, the edges being

jagged and uneven. The uterine tissue in the vicinity of the rupture was perfectly healthy. There were no signs of old or recent peritonitis. The placenta was firmly adherent: had the poor woman lived I think it could not have been removed except piecemeal. The abdominal was the only cavity examined.—*Obstetrical Journal, July* 15, 1880, *p.* 398.

74.—ON THE TREATMENT OF MENORRHAGIA.

By Dr. J. Matthews Duncan, LL.D., Physician-Accoucheur, and Lecturer on Midwifery, at St. Bartholomew's Hospital.

In all cases where the loss is great you enjoin rest, but only in such. You can easily understand that exercise, stimulating the circulation, will tend to increase the flow. The rest you prescribe must be horizontal; and the patient must not, in extreme cases, get up even for purposes of urination and defecation, for the blood-pressure is greatly and injuriously increased by stooping and pressing down in performing these functions.

Then we come to medicines. Of all the medicines with which I am familiar—and I have tried a great number—ergot stands first. In obstetrics you are generally told that ergot produces its effect in about fifteen minutes: that is doubtful even in parturition; but in the unimpregnated woman you must not expect it to act thoroughly till days of its use have elapsed, and in some cases I have observed its use has had no result until it has been continued for weeks without intermission. After ergot, in popular estimation, come gallic and tannic acids. I am not quite sure that they have any effect at all. They may have an effect, and be as rationally used as other medicines. I have used them extensively, and the impression they have left on my mind I have just told you. The medicine which seems to me next best after ergot of rye is sulphuric acid, often combined with some saline; and no injury is done if the saline produce slight relaxation of the bowels. You have not long to wait for sulphuric acid to produce its effect. You may have to give it in large doses, and frequently; for instance, you may give one drachm, or even twice as much, in a day, dividing it into frequent doses. The beneficial influence of digitalis and cannabis indica is almost certain, yet in point of reliability these remedies come considerably after ergot and sulphuric acid.

One of the most powerful influences, and one with which I have been long familiar, is the use of heat. Heat is supposed by most people, professional and non-professional, to favour bleeding; but its influence in causing the contraction of involuntary muscles has long been known, and its use in cases of menorrhagia and metrorrhagia, whether simple or not, is very

valuable. It is to be applied internally in the form of irrigation, by the passing through the vagina of a large quantity—pints—of water at 100° to 110° Fahr. This is not to be done long at a time, being continued five to ten minutes, and repeated several times a day. It is almost universal to swear by cold as a hemostatic in our diseases, and I need not say that I have seen it used, and used it myself many times. In the form of ice, applied to the external parts, it is, I think, quite as often injurious as not. It is best used by irrigating the vagina just as is done with hot water, or by placing small bits of ice in the vagina. Even used in this latter way, my impression is that its value is inferior to that of heat.

If all these means fail you may have to resort to a plug. In the virgin this is very difficult to insert. The operation indeed may be quite impracticable. But if the woman be married, and still more if she has had a child, it is easily made available, and you will often be astonished at the good result of even what seems to be a very imperfect plug. You will sometimes find a small sponge capable of controlling quite a formidable menorrhagia.

There are cases of simple menorrhagia even in young virgins that prove fatal; and you are not to suppose that we have nothing to do for them beyond what I have already mentioned. The last remedy is to paint the bleeding surface with "styptic." If the womb is dilated the bleeding surface may be easily reached. If the os uteri be not dilated you can pass such an instrument as this hollow probe and inject the styptic through it, which will have the same effect as painting. The instrument, you see, is fitted to a small syringe.

Many of you will remember a fatal case of this injection with perchloride of iron, and therefore I hesitate to recommend that drug, although I think it is the most powerful styptic we have. I would advise you to use tincture of iodine; or, if you do use perchloride of iron, it should not be by injection. The bleeding surface may be swabbed with it, so that it may not pass into the veins, which was the disastrous accident in the case referred to. You may also try other drugs, such as a solution of alum.—*Med. Times and Gazette, Aug.* 7, 1880, *p.* 147.

75.—THE VARIOUS METHODS OF DEALING WITH THE PEDICLE IN OVARIOTOMY.

By J. Knowsley Thornton, Esq., M.B., C.M., Surgeon to the Samaritan Hospital for Women and Children.

The pedicle of an ovarian tumour is made up of the blood-vessels, lymphatics, nerves, and ligament of the ovary, united by more or less areolar, fibrous, elastic, and unstriped mus-

cular tissue, and covered all round with a layer of peritoneum. Along with this true pedicle we may also have the round ligament of the uterus, and still more commonly the Fallopian tube. This latter does not necessarily always form part of the pedicle; but I believe it is always wise to include it—first, because there is no object in leaving a structure whose function is gone with the removal of its ovary; second, because I have observed several times that when the ovary is ligatured off from the tube, the latter at once becomes intensely congested. I have even seen it bleed from rupture of its distended vessels. It is quite clear that, left in this condition, it must be a source of danger, and as removing it in no way increases the danger, and is, as I have said, indicated, as its function is gone, I think it best always to include it in the pedicle.

In considering how we may most advantageously deal with this complex structure, the pedicle, when removing an ovarian tumour by ovariotomy, we shall find that each of the component parts requires some share of our attention. The blood-vessels are of course the most important, and the first and great object of any method is security against hemorrhage. But while attending to this, we cannot ignore the convenience of the other tissues in and around the pedicle. We have to remember that the lymphatics are closely connected with the whole peritoneal surfaces, and with those of the lower extremities, and that mischief set up in those of the pedicle may thus rapidly spread over a large area; that the nerves must not be unduly irritated; that the muscular tissue by its contraction may cause the stump to work out of the grasp of any constricting agent which we employ, and that the extreme elasticity of the pedicle tends to the same misfortune.

The method which most effectually prevents hemorrhage, and is least obnoxious to the tissues, is the one we seek.

Theoretically, torsion and the écraseur are the most perfect methods possible, but they labour under the disadvantage of being but imperfect safeguards against hemorrhage.

In 1858, Hutchinson suggested and employed the clamp. With various modifications, this instrument has found great favour with ovariotomists. I suppose the readiness with which it can be applied to most pedicles, and the feeling of security it gives against hemorrhage, have led to this popularity, for a more unscientific instrument it is impossible to imagine.

In spite of the success which attended its use in the hands of Mr. Wells, I early conceived a great dislike for it, for reasons which I shall give immediately, and I only used it seven times after I began to operate myself. The first and great objection to it is, that it fixes the pedicle in the wound, and causes, after cicatrisation is complete, a drag upon the cicatrix, and thus

predisposes to ventral hernia, which is one of the greatest misfortunes following ovariotomy. Patients suffering from this are made very miserable: they have a constant sense of weakness, dragging pains at the site of rupture, and frequently almost constant backache and lassitude.

Another evil resulting from the use of the clamp is patency of the Fallopian tube and discharge of blood at the monthly periods. This is usually only temporary, lasting for a few months after operation, but in some cases it is much more persistent; and I know of more than one case in which this condition continues years after the operation. A few days before each period, the cicatrix, at the site of the pedicle, becomes so tender that the belt can hardly be borne, then a little discoloured bleb forms and breaks, discharge continuing during the remainder of the period.

Septic peritonitis commencing in the peritoneal covering of the pedicle, and thence spreading inwards, adhesion of intestine to the pedicle with fatal obstruction, septic poisoning when the clamp separates and the stump retracts into the wound, hernia of the pedicle and dragging pain, with troublesome vomiting, are among other rarer complications attending its use. I have seen examples of these conditions, and many such cases have been recorded.

A still rarer accident, but one which has occurred more than once, is hemorrhage from the clamp cutting the pedicle. To these graver evils must be added prolongation of the time during which the patient has an open sore, and the necessity for a daily dressing, with frequently an amount of offensive discharge, which is detrimental to the general salubrity of the hospital atmosphere. Serious hemorrhage has occurred on the separation of the clamp; and cases are on record in which it has slipped into the peritoneum during coughing or vomiting, or from extreme tympanitic distention.

I do not think such a list of objections can be supported from experience against any of the other methods if we except the long ligature. I have not thought it necessary to refer in detail to the misfortunes following the use of the latter, as I think it may fairly be considered as quite obsolete.

I do not propose to allude to the many forms of clamp which have been suggested and used, but I think the pattern which Mr. Wells has used most is decidedly the most efficient and most easy of application.

Having expressed this strong opinion of the demerits of the clamp, I am bound to confess that in certain cases of removal of uterine tumours it still answers better than any method yet introduced, though I am confident that, with time and experience, we shall find something to supersede it. Koeberle's *serre-*

nœud has found favour with some, though I cannot see any great difference between his method of using it and the simple ligature with the pedicle fixed in the wound.

In 1869, Sir James Simpson proposed and successfully used his favourite plan of acupressure for the treatment of the ovarian pedicle, but it has not found favour with ovariotomists, and need not detain us.

Dr. Gustavus Murray, in 1865, employed a figure-of-eight ligature, and I have myself seen him apply this ingenious method with success.

In 1864, Mr. Baker Brown introduced the actual cautery; and theoretically this is certainly one of the best methods. It is not, however, by any means of universal applicability, and in many cases its use has to be supplemented by the ligature—a fatal objection to it, in my opinion, because the ligatures have then to be applied on half-dead tissue, and the portions they include are much more likely to slough. Thus, in his first five hundred cases, Mr. Wells used the cautery thirty times, but in fourteen cases it had to be supplemented by the ligature, and, as we might expect, the mortality in the fourteen cases was double that in the sixteen cases in which the cautery alone sufficed.

The great advantage of the cautery is that it leaves no foreign substance in the peritoneum, but it leaves a lump of half-cooked tissue, and, except as affording more security against hemorrhage, cannot claim any advantage over Maisonneuve's plan of torsion.

We cannot, however, forget the magnificent results obtained with the cautery by Dr. Keith. I am not sure whether he has ever published any accurate statement of the number of cases in which he had to supplement the cautery by the ligature; but whether his cases were treated by cautery alone, or by cautery and ligature, the results are such as must commend the method. I have rarely tried it myself, and when I have, have been obliged to supplement its use by one or more ligatures.

In 1868, Masslovsky of St. Petersburg cut peritoneal flaps, and so covered in the cut end of the pedicle, believing that this would prevent its adhesion to neighbouring organs. The objection to this is that the flaps are likely to confine the serous discharge, and thus lead to tension and suppuration in the enclosed end of the stump.

In 1869, Dr. Macleod of Glasgow invented some very ingenious forceps for complete torsion of the pedicle; but the cases in which they are applicable are very rare.

In the same year, Dr. Nunn of Buffalo performed complete enucleation of a cyst without applying any ligatures. This method is very valuable in certain broad ligament cysts, and I

have many times employed it for partial removal of a tumour, but it is rarely we can complete the operation without some ligatures. Partial enucleation enables us to remove some tumours which could not be removed at all without it, but it adds much to the risk of the operation.

In 1869, Dr. Peaslee invented a very ingenious drainage-tube and knife, by means of which the ligatures could be cut and removed at any period after the operation, when they were supposed to have performed their function, but I think its ingenuity is its chief claim to our notice.

Other slightly different methods have been suggested or adopted by various operators, but they are merely slight modifications of some of the above, and do not call for special remark.

Complete Intra-peritoneal Ligature of the Pedicle.—In 1861, Dr. Tyler Smith, in performing his eighth ovariotomy, reintroduced the method of Nathan Smith, transfixing the pedicle, cutting the ligatures short, and dropping the stump back into the peritoneum. To him undoubtedly belongs the credit of popularising this method with the profession, though he cannot deprive our American brethren of the honour of first introducing it.

Having seen Mr. Wells employ this method in a large number of cases in which it was impossible to employ the clamp, I became convinced that it was *the method* of the future, and only needed to be applied constantly in a long series of cases to establish its superiority over other methods.

First. It is universally applicable.

Second. It is, when used with sufficient care, a perfect safeguard against hemorrhage.

Third. It is scientific in principle.

Fourth. It is neat, cleanly, and speedy in application.

Fifth. It allows the incision to be completely closed at once, and thus hastens convalescence.

Sixth. It completely obliterates the pedicle stump as quickly as any intra-peritoneal method does, and more quickly than any extra-peritoneal method.

In thus claiming for the complete intra-peritoneal ligature of the ovarian pedicle in ovariotomy the foremost place among the many methods I have named, I must point out that there are many different ways of applying it, and I shall endeavour to prove by my own practice that the method I have advocated in my paper in the British Medical Journal in January, 1878, is the most in accordance with the needs I have pointed out in my introductory remarks, and will give us the best results.

If we intelligently and carefully consider the teaching of the early cases of complete intra-peritoneal ligature in which recovery took place, it is at once plain that the distal portion of

the stump did not slough. It is quite inconceivable that a patient could get well if it did, except in the few cases in which it was discharged through the wound. This important lesson seems to have been almost entirely lost sight of for many years, however, and we find writers on the subject indulging in all sorts of absurd and unlikely theories as to the action of the ligature, and the changes it produces. I have said that in 1861 Dr. Tyler Smith revived the practice of complete intra-peritoneal ligature, and with sufficient success to make it remarkable that any doubt could remain as to the changes taking place in the stump when so treated. Yet, seven years later, in 1868, Spiegelberg and Waldeyer published in Virchow's Archives a series of experiments on animals from which it is evident that they considered the matter still *sub judice*. For a short account of these experiments, together with valuable observations on the complete intra-peritoneal ligature, I would refer to Mr. Wells' well-known work on Diseases of the Ovaries. Other very interesting experiments by Masslowsky of St. Petersburg, will also be found in the same part of Mr. Wells' work. Peaslee, who shows an admirable power for collecting and comparing the observations and experience of others, and whose work must ever retain a very high place as giving a complete history of ovariotomy down to his own time, makes the following astounding statement in speaking of the use of the short and long ligature :—

"It admits of a complete closure of the incision if the ends are cut close, and very nearly so if they are brought through the incision. *But this is rather a matter of taste and convenience than of much practical importance.*" (The italics are mine.) This, though he afterwards goes on to prove from his own practice that the pedicle does not slough when treated by the short ligature. I will now quote from my own paper, already referred to :—"In one of my cases I tied a large piece of omentum adhering to the cyst in two places, and divided it between the ligatures, thus leaving a stump on the outside of the tumour very like that of the ovarian pedicle. I afterwards injected the cyst with Beale's Prussian blue fluid, and, when the injection was complete, noticed that the distal end of this stump was blue, though not so blue as the proximal part, and there was no appreciable escape of the fluid from its cut surface. Microscopic examination showed that the injection had passed into the minute capillaries, but not into the larger vessels, except where it had passed into them by the anastomoses beyond the ligature. If the injection would so pass, the blood would also pass ; and in this way the vitality of the part would be at any rate partially sustained until the other processes by which the distal end of the stump is nourished had time to be completed."

I afterwards enumerated certain of the processes by which the stump is nourished, as observed by myself, as follows:—The ligature buries itself in the peritoneal coat of the pedicle, and vascular connections are rapidly established between the parts adhering over it. Lymph is thrown out over the end of the stump and over the ligatures; in this new vessels form. The stump adheres to some neighbouring surface, and from that derives its main blood-supply. In either case the passage of blood through the capillaries under the ligature is an important aid. By whichever method the nourishment of the stump is carried on, the strands of the ligature are separated by ingrowth of new cells, and it is soon absorbed and disappears. Sometimes the knot (or the whole ligature, if very thick silk is used) becomes encapsuled, but complete disappearance is the rule. It will be obvious that the least favourable method is that in which the cut surface of the stump adheres to some neighbouring part; because if be to intestine it may cause a kink and direct obstruction, and if it be to some other part it may form a bridge, under which a coil of intestine may become adherent or strangulated, and thence may follow indirect obstruction.

It may be as well here to allude to another objection which has been raised to the complete intra-peritoneal ligature, and that is the risk of hematocele, similar in origin to that occurring externally after the use of the clamp. That this is extremely unlikely is theoretically apparent when we study the above processes of repair and obliteration of the stump. And as a practical proof of the truth of the theory, I may mention that I have only had one case of hematocele occurring after ovariotomy in over 170 cases treated by the complete intra-peritoneal method, and that was in a case of twisted pedicle—the vessels and tube being obliterated by the twisting, and consequent inflammatory changes, before I ligatured it,—and the hematocele came on so distinctly after chill at the period-time that I think it is quite likely it was altogether independent of the pedicle and of the operation.

I have little to add to the advice I gave in the paper from which I have quoted as to the kind of ligature and the method of applying it.

No. 3 or 4 Chinese Silk, applied by one or more transfixions, according to the breadth of the pedicle, each loop interlocking with its neighbour so that a perfect chain is formed. In my previous paper I advocated the use of a special fine ligature, applied so as to include the veins of the pampiniform plexus in the outer part of the pedicle, "whenever the outer edge of the broad ligament feels tight as one passes the fingers along it." I now always use this special ligature, and I may take the op-

portunity of saying that I was the first to use it in the Samaritan Hospital, and also the first to advocate and use the complete interlacing of ligatures in pedicles in which a single transfixion does not afford sufficient safeguard against hemorrhage. I have recently made a very interesting and important observation with regard to the method of using this outer-edge ligature. For it to be of service it is essential that it should embrace the whole of the mass of veins already referred to—a fact entirely lost sight of by some of those who have copied the method without understanding my reason for adopting it, and use it as if its sole aim were to make a little grove in the outer edge of the pedicle as a guide to tying the other ligatures.

When it is properly applied, almost all the venous channels for the return of blood from the cyst are closed, and the main arteries not being interfered with, the cyst rapidly becomes injected and congested. We have thus a beautiful method for bleeding the patient into her own tumour, if it seem desirable that she should lose a little blood, and I have twice lately been able to demonstrate this fact to those present at my operations. It will at once be seen that when operating on a feeble patient, or one who has lost much blood from adhesions, it becomes of vital consequence to apply this ligature *after* the arterial trunks have been secured by the ordinary transfixing ligatures. No. 1 Chinese silk, which I also use for the sutures, I use for this special ligature.

With the view of avoiding the occasional complications arising from adhesion of the cut surface of the pedicle to neighbouring organs, I adopted the plan of sewing over the posterior edge of the cut surface to the peritoneal surface of the anterior uterine *cul-de-sac*, and I still occasionally do this. It cannot in all cases be neatly done, and it adds somewhat to the length of the operation, but I am sure it is very efficient in gaining the end I proposed to myself in adopting it; and I have recently had an opportunity of examining a pedicle I had thus treated ten months before, the patient having in the interval developed a tumour of the other ovary, which I have recently successfully removed. The place where I had sewn up the pedicle was indicated by a very minute projection (half the size of a horse-bean), and there were no adhesions to any other surface. I now guide my practice in this respect much by the position which the pedicle seems inclined to occupy when I push it back into the peritoneum. In the majority of cases, if the ligatures have been carefully applied, it will naturally curl over the edge of the broad ligament, and lie conveniently out of the way in the anterior *cul-de-sac* without being sewn there. I still hold to my opinion that it is not advisable to tie the pedicle too tight; and I am convinced that this too-tight tying is the

cause of unnecessary pain and occasional high temperature, and I incline to the belief that it explains occasional cases of tetanus. It also tends to complete strangulation of the distal portion. If I am not quite satisfied as to my first ligatures being secure, I tie another round the whole, using the ends of one of those already tied or a separate ligature. This by bunching up the pedicle exerts sufficient pressure to stop any slight oozing; and this with a minimum of force in tying this final ligature. I use one of the suture-needles or a finer curved one for the outer-edge ligature, and the ordinary handled perineum, or fistula-needles, of various curves for the transfixion; and I infinitely prefer a fine, sharp needle to any of the blunt ones in use. It is easy in most pedicles to avoid puncture of a vessel with a fine-pointed needle, and if one is punctured the opening is small and the bleeding stops when the locked ligatures are tied; whereas with a broad, blunt-pointed needle splitting of the broad ligament is a frequent occurrence, and vessels are quite as often opened as with the pointed needle, and with a much larger hole.—*Medical Times and Gazette, May* 22, *and June* 5, 1880, *pp.* 552 *and* 606.

76.—ON THE DIAGNOSIS OF TUMORS OF THE MAMMARY GLANDS.

By Dr. Samuel W. Gross, Surgeon to, and Lecturer on Clinical Surgery in, the Jefferson Medical College Hospital, and the Philadelphia Hospital, U.S.

In the formation of a correct diagnosis of mammary tumors it is of the last importance that both breasts be fully exposed, and that the patient be placed in the recumbent posture. With regard to the first point little may be said, as a comparison of both glands frequently serves to clear up features which were obscure when the examination was confined to one alone. In many women who have borne children, and the more especially if the breasts be lax, if, as too commonly occurs, the organ be explored when it is partially confined by the corset, and it be seized between the thumb and fingers when the patient is seated, an enlarged or apparently enlarged lobe may be felt, which conveys the impression of a distinct tumor. If, however, the patient be recumbent, and the gland be permitted to rest in its normal position, gentle pressure with the fingers backward toward the chest will show that the supposed neoplasm has disappeared; while, if one really exist, it will not only not elude this mode of manipulation, but be rendered more prominent. The presence of a new growth having been determined, the first desire of the surgeon is to ascertain whether it be of a carcinomatous or a non-carcinomatous nature.

In the differential diagnosis of the cancerous and so-called benign neoplasms the deductions based upon the study of their etiology are, for the most part, without value. Hereditary predisposition, when it can be traced, is an antecedent which favours the idea of carcinoma; but it must not be forgotten that the most innocent formation, as in the case of a retention cyst, occurring in a lady, forty-three years of age, who was recently under my charge, not infrequently occurs in the daughter of a cancerous mother. So, too, the development of a tumor after the age of forty out of an induration left by puerperal mastitis, points to cancer, as that condition antedated 8·21 per cent of the carcinomatous, and only 1·44 per cent of the non-carcinomatous growths.

Age, as an indication of the anatomical arrangement of the component tissues of the mamma, is, as I have previously shown, so important an aid in the diagnosis that a neoplasm occurring before the twentieth year may safely be pronounced to belong to the non-carcinomatous group, while the chances in favour of carcinoma are as twelve to one after the age of forty. To be more exact, I have framed the following conclusions in regard to the structural development of the mamma, as manifested by the age of the patients, and the development of its neoplasms:

First. During the rudimentary condition of the organ almost the only growth met with is fibroma.

Secondly. When the glandular structure is being evolved, after the appearance of the menses, and the connective tissue is still in excess, fibroma and fibrous sarcoma are the most common growths.

Thirdly. At the epoch of and after the first pregnancy, that is, between twenty and thirty years, when the glandular structure is perfected and the connective tissue is vascular, succulent, and rich in cells, fibromata and small round-celled, or small spindle-celled sarcomata, which are equivalent to medullary sarcomata, are to be anticipated.

Fourthly. From the thirtieth to the fortieth year, or during the stage of passive maturity, cystic sarcomata and cystic fibromata are most frequently met with, and true adenoma is also most common.

Lastly. During the period of involution, when the lacteal glands are disappearing, and the connective and adipose tissues are becoming abundant, myxoma and carcinoma make their appearance.

Of the symptoms themselves, valuable information is to be derived from the consistence, dimensions, isolation, and mobility of the growth, as well as the condition of the skin, nipple, subcutaneous veins, and the associated glands. As the ma-

jority of these signs have been sufficiently dwelt upon in a preceding table, I will only direct attention to those which are the most important.

In the non-carcinomatous tumors the skin, while it may be thinned, stretched, and discoloured, or somewhat adherent, is rarely invaded by cell infiltration, and is never the seat of distinct nodules or tubers. In carcinoma, on the other hand, its infiltration by advancing epithelial cells gives rise to a hard, brawny condition, which is very characteristic, or to extensive adhesion or discolouration, or to distinct tubers, and it is not infrequently pervaded by beaded or varicose lymphatics, which, so far as I know, are never seen in the opposite class of tumors.

While ulceration is less frequent in the non-carcinomatous than in the carcinomatous growths, it also arises in a very different way, and has certain peculiarities which are distinctive. Thus, it is the almost invariable result of limited gangrene of the thinned and stretched, but not infiltrated, skin; while its edges are smooth, soft, and sometimes elevated upon the fungus which protrudes through, without being attached to, it. Such an appearance is peculiar to the non-carcinomatous growths, and is, of itself, quite sufficient to exclude the idea of carcinoma.

The nipple is permanently retracted in more than one half of the cases of carcinoma, while it is sunken, by the protrusion of the tumor beyond its level, in only one out of every twenty of the non-carcinomatous neoplasms. This contrast is most striking, but it is not more so than one might expect, when the contracting nature of carcinoma is borne in mind. When, in addition to the retraction, the mamilla is also fixed and indurated, these conditions may almost be regarded as pathognomomic of carcinoma. Discharge from the nipple merely indicates that the glandular structure is involved, either primarily or secondarily, and that one or more of the ducts leading from the secreting lobules are permeable. When it antedates the detection of a tumor, there is every probability that the growth is an adenoma. If the neoplasm has a solid and hard feel, it is probably a carcinoma, since a discharge is only met with in the cystic non-carcinomatous tumors.

Fixation, or adhesion, to the walls of the chest is a valuable symptom of carcinoma, inasmuch as it is ten times more frequent and far more extensive, than in the opposite class of growths.

Of all the signs, there is none which is so valuable in the differentiation as the state of those lymphatic glands which are in anatomical connection with the breast. Thus, in every one hundred cases of carcinoma, when the patient first comes under observation the axillary glands will be found to be enlarged

and indurated in sixty-four, and in nearly one third of these the glands above the clavicle will also be contaminated. Of the non-carcinomatous tumors, on the other hand, out of every one hundred cases, in only three are the axillary glands enlarged, while they are never densely hard. The glands above the clavicle are never implicated.

The diagnosis of the non-carcinomatous neoplasms is based, therefore, upon their occurrence in one case out of every six and two-thirds before the age of twenty; their greatest frequency before the fortieth year; their multiplicity in one breast; their circumscribed, rounded or ovoid and bossed outline; the firm consistence of the smaller and the unequal feel of the larger; their mobility in or on the breast and the adjacent tissues; their comparatively rapid growth and large volume; the almost normal appearance of the skin; the enlargement of the superficial veins when they are bulky; their tendency to ulcerate and fungate late in the disease; and the absence of adhesions between the protrusion and the circular and, as it were, punched-out margins of the ulcer; and, finally, their freedom from a history of hereditary predisposition, retraction of the nipple, and enlargement of the associated lymphatic glands.

The points in favour of carcinoma are a history of heredity; non-development before the twentieth year; greatest frequency after the fortieth year; irregular, knobby outline; uniformly densely hard consistence; immobility in the breast; relatively small volume and slow growth; retraction of the nipple; enlargement and induration of the lymphatic glands; invasion of the skin; fixation to the pectoral muscle or walls of the chest; limited ulceration, late in the disease, without any tendency to fungous protrusion; and the thickened, indurated, and everted edges of the ulcer.

The gross anatomical characters of these two classes of neoplasms are sufficiently characteristic for diagnostic purposes. The carcinomatous are not surrounded by a limiting capsule, so that their attachments are so close that they are with difficulty freed from the adjacent skin, fat, fasciæ and muscles. On section, they are firm, crisp, tough, and often creak under the knife. Their cut surfaces assume a concave appearance, are not lobed or cystic, and can not be torn into small bundles; and their grayish basis is traversed by minute points of fat or by yellow lines, which represent the remains of ducts with their contents in a state of fatty degeneration. They are also frequently pervaded by glistening white fibrous bands, so as to look like the section of an unripe pear, and a pultaceous, milky fluid exudes from them on pressure or scraping.

The non-carcinomatous neoplasms are surrounded by a

fibrous capsule, through which they can readily be detached from the surrounding tissues. Although they may be tough, they rarely creak on section, and their divided surfaces are plane, or they may even be prominent, and are never concave. Many, and particularly the sarcomata, have a fibrous tear, which is very characteristic, and not a few are lobed. They are not streaked by yellowish lines, nor do they contain pellets of fat. They are, moreover, frequently the seat of dilated ducts and vegetations, and exude a serous fluid on pressure. An open-mouthed duct, or a small cyst or two, may be found in carcinoma, but they are, with very rare exceptions, free from vegetations. On the whole, the presence of a limiting capsule and of enlarged ducts and vegetations, and the absence of fat and concavity on section, are quite sufficient to distinguish the non-carcinomatous from the carcinomatous tumors.

Although the lines of demarcation between many of the tumors of the mamma are not very distinct, yet a careful attention to their more prominent signs enables one to arrive at a pretty correct judgment as to their true nature. From an analysis of the cases that have occurred in my own practice, and of those collated from various sources, I have framed the following conclusions:

1. A uniformly hard, perfectly movable, nodular, slowly growing tumor, particularly if it be seated at the upper and outer part of the gland of impubic subjects and of married women toward the twenty-third year, and be free from ulceration, alterations in the skin, veins, nipple, and lymphatic glands, is a solid fibroma, and the diagnosis is strengthened by the presence of several growths in one or both breasts.

2. A hard, lobulated, peripheral tumor, or one which, after having remained stationary or progressed slowly for several years, suddenly and rapidly acquires a large volume, assumes an unequal consistence, being firm at some points and soft or fluctuating at others, occurring toward the thirty-sixth year, unaccompanied by lymphatic involvement, but attended, possibly, with discolouration of the skin, deformity of the nipple, and limited superficial adhesions, and, it may be, with dilatation of the veins, discharge from the nipple, and ulceration and fungous protrusion, is a cystic fibroma.

3. A firm, rapidly growing, peripheral tumour, appearing in prolific married females at about the thirty-seventh year, with, possibly, discoloration and adhesion of the skin, and ulceration, but without deformity of, or discharge from, the nipple, or enlargement of the glands, is a solid sarcoma. A tumor possessing these attributes and occurring toward the thirty-second year is probably a firm spindle-celled sarcoma, while one

developing at about the forty-second year is more apt to be a firm round-celled sarcoma.

4. A lobulated tumor, particularly if it involves the greater part of the mamma, of quick growth from the commencement or progressing rapidly after having increased comparatively slowly for some time, of large size, of varying or unequal consistence, occurring toward the thirty-third year, in prolific married subjects, and attended with discoloration of the skin, ulceration, enlargement of the veins, and, possibly, with discharge from the nipple and limited adhesions, or, it may be, with deformity of the nipple and glandular enlargement, is a cystic sarcoma. A very rapidly progressing tumor, of soft, apparently fluctuating consistence, with stretched skin and enlarged veins, appearing in young girls before puberty and in young married women, is a medullary sarcoma, which may be solid or cystic, and is, as a rule, composed of small spindle-cells.

5. A solitary, rapidly and continuously growing, although not very bulky, rather firm, or, possibly, soft tumor, occurring at about the forty-fifth year, with limited discoloration of the skin, but not fixed to the chest, and attended, possibly, with deformity of the nipple, superficial adhesions, ulceration, dilatation of the veins, and enlargement of the axillary glands, is a solid myxoma.

6. Cystic myxoma possesses the same consistence and growing attributes of the former variety, but it develops at about the forty-eighth year, and is liable to be attended with discoloration, adhesion, and ulceration of the skin. The veins, nipple, and glands, however, are normal.

7. A hard, heavy, nodular, solitary, very slowly and equably increasing tumor, especially if it develops in the immediate vicinity of the nipple of a married woman toward the thirty-fifth year, and is accompanied by adhesion and discoloration of the skin, and ulceration, and, possibly, by deformity of the nipple and enlargement of the glands, but is free from fixation to the chest and dilatation of the veins, and is preceded by a discharge from the nipple, is a cystic adenoma. A solid adenoma can not be distinguished from a solid fibroma.

8. A densely hard, inelastic, irregular, solitary, slowly growing tumour, occurring in prolific married females toward the forty-eighth year, inseparably connected with the mamma, accompanied by induration and enlargement of the associated lymphatic glands, retraction of the nipple, infiltration of, and, possibly, nodules in, the skin, ulceration, and fixation to the chest, and, it may be, by a discharge from the nipple, is a scirrhous carcinoma; and the diagnosis is strengthened if there be a

history of heredity, if the tumor was preceded by psoriasis or eczema of the nipple, or if it developed from an induration left by puerperal mastitis.

9. A soft, lobulated, voluminous, solitary, and rapidly increasing tumor, occurring in the same class of women, at about the fiftieth year, and attended with infection of the glands and skin, retraction of the nipple, fixation to the chest, and possibly extension to the opposite breast, but without discharge from the nipple, or marked tendency to prominence of the veins or ulceration, is a medullary or encephaloid carcinoma.

10. A hard, very slowly growing, small, solitary tumor, occurring toward the forty-fifth year, with adhesion to the skin, and it may be, nodules in that structure, prominence of the veins, retraction of the nipple, and enlargement of the glands, and, possibly, with invasion of the opposite breast, fixation to the chest, ulceration, and discharge from the nipple, is a colloid carcinoma.

11. A densely hard, irregular and knotty, contracting and small, solitary tumour, occurring at about the forty-seventh year, and attended with retraction of the nipple, infection of the glands and skin, and possibly, distinct tubers in the latter structure, ulceration, and immobility on the chest, is an atrophying scirrhus.

12. A slowly increasing, solitary, nodular, or slightly lobulated tumor, occurring after the menopause, covered by thinned and discoloured skin, fluctuating, and, probably, discharging by the nipple, but without enlargement of the veins or glands, and without fixation to the chest, is an involution cyst.

13. A solitary, smooth, firm and elastic, or, possibly, fluctuating tumor, occurring in the vicinity of the nipple of young and prolific married women, of moderate volume, of slow growth, and unattended with alterations in the veins, nipple, skin, or glands, or with adhesions, but liable to ulceration and enlargement of the glands if it inflames, is an evolution cyst.

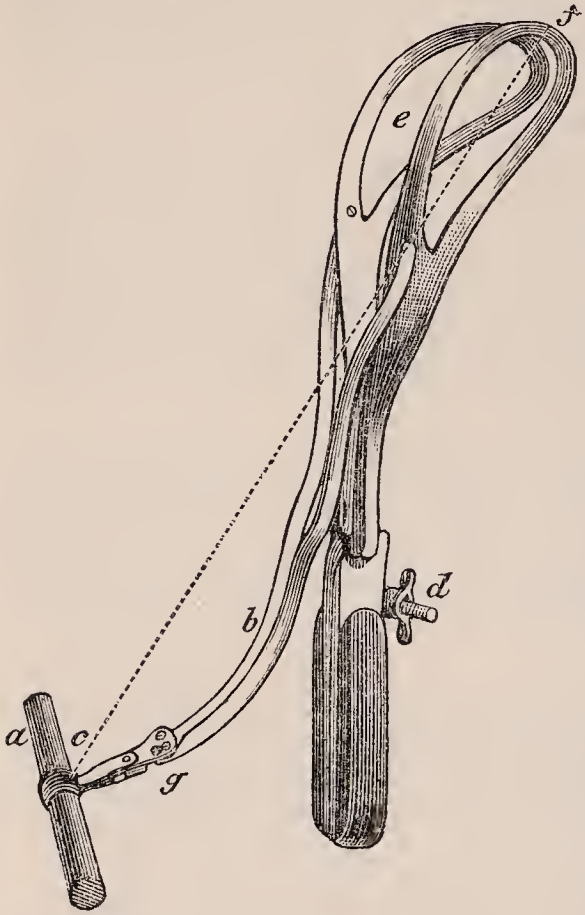
14. A solitary, slowly growing, not bulky, fluctuating, or semi-solid tumor occurring near the nipple of lactating women, and unattended with changes in the coverings of the mamma or in the glands, is a lacteal cyst.

15. A slowly growing, small, smooth, round, firm and elastic, or fluctuating, solitary tumor, occurring between the ages of twenty and thirty years, seated at the upper and outer border of the breast, and not near the mamilla, with a disposition to ulcerate, but without other changes in the skin, veins, or glands, is an hydatid cyst.—*New York Med. Jour.*, *June* 1880, *p.* 561.

77.—ON A MODIFICATION OF SAMPSON'S FORCEPS.

By Professor A. R. Simpson.

Since Tarnier introduced his forceps, there have been various attempts on the part of British accoucheurs to adopt his principle of axis-traction in a simple manner. The subjoined woodcut shows how Professor A. R. Simpson has modified the well-known Sampson's forceps. To each blade is affixed a curved rod. The rod (*b*) on the left blade has the traction handle (*a*) joined to it. Thus, the right blade has only a traction rod, which locks with the traction handle by a simple slot (*g*). The old handles are made smoother and lighter. The letter *d* marks the fixation screw. There are thus only two pieces in the forceps. When the forceps is applied and traction made, it can be seen by the dotted line that this is in the exact proper axis. The blades are introduced just as those of the old Sampson forceps are, viz.: the left blade first and to the left side; the right blade is then passed to the right side—the only point being that, while it is being passed, the traction rod should be swung to the front. When the blades are locked, it is then swung back and fixed by the slot (*g*). The forceps is represented as it will be when passed and while traction is being made.



This forceps has been used on several occasions, and with great success. Mr. J. Gardner, 45, South Bridge, Edinburgh, is the maker.—*British Medical Journal, June* 26, 1880, *p.* 976.

78.—NEW CERVICAL CURETTE.

By Dr. Alexander Duke, Assistant-Physician to the Rotundo Hospital, Dublin.

The difficulty of removing the plug of ropy mucus which fills up and in some cases hangs from the "os," as in chronic endometritis, cervicitis, &c., must have been experienced by

every gynecologist, and its detrimental effects (by protecting the cervical walls from the action of the usual escharotics, and so retarding the patient's cure) must be sufficiently apparent.

It is usually recommended to clear the canal of mucus by the introduction of the probe armed with wadding dipped in glycerine; but this is not at all sufficient, nor does the removal of such discharge as can be seen through the speculum give any idea of how much still remains, the coagulation of which by the subsequent caustic application neutralises, if not altogether destroys, the desired effect of the remedy. The woodcut represents a little instrument which (feeling the want of) I have designed, and which I have found very useful in the cases I speak of. I have named it a cervical curette. It is simply introduced through the speculum into the cervix as far as it will go with facility (which is generally up to the inner os), but in some cases will pass further, owing to the relaxed condition of the parts. It is then rotated slowly several times and withdrawn, when the top of the instrument will be found filled with tenacious mucus, a brisk shake of which will dislodge its contents, and it can be reintroduced till all the mucus is thus removed. The cervical canal is then in a condition to be acted upon by the usual applications, and I have found by this simple means the time occupied in the treatment of a case can be very considerably shortened. The curette has also another advantage; as the rotation of its blunt edges in the cervical canal destroys those granulations and enlarged follicles, for which some practitioners recommend the use of a sponge tent. The instrument is nickel plated, can be cleaned in an instant either by being held under a stream of water or whisked through the same, and it has proved so useful in my hands, that I do not hesitate to make it known, in the hope that it may be equally useful to others. The maker is John Whyte, Dublin.—*Medical Press and Circular*, *Nov.* 17, 1880.

79.—ON CONVULSIONS IN CHILDREN.

By Dr. A. A. Smith, Professor of Materia Medica and Therapeutics, and Clinical Medicine, Belle Vue Hospital Medical College, New York, U.S.

At a meeting of the New York Academy of Medicine (New York Medical Record, May 8), Dr. A. A. Smith read a paper on convulsions in children. He thought the statement frequently met with in literature that convulsions in children

independent of organic disease of the brain, were rarely serious, was very liable to mislead the young practitioner; for, if it were admitted that one in one hundred cases might be dangerous, the statement must be modified. He believed that any case of convulsions might be dangerous, and, therefore, the physician should always study each case carefully. Probably the age at which children were most liable to have convulsions was between six and twenty-eight months—the period of dentition. They did not occur simply because dentition occurred during that period, but, in addition, the nervous system of the child was then rapidly developing and was much more impressible than in adult life. Usually, the tendency to disturbance of the nervous system manifested itself differently among different members of the same family. For example, if a temperature of 105 deg. Fahr. were developed in a child as the result of simple indigestion, it was very evident that the child possessed a nervous system that was very susceptible to the influence of slight irritation, and such a patient needed watchful care in any form of illness. Hereditary tendency was an important factor in the etiology of convulsions in children, and, in the majority of cases, the predisposition was transmitted by the mother. If, as was maintained by many good observers, diseases of the nervous system were greatly on the increase in the United States, and if it were true that predisposition to convulsions was transmitted from parents to children, the question of convulsions in children was more important than it ever had been. In a few cases, he had been able to find a history of convulsions in the childhood of the mother. The weight of opinion was, that puerperal convulsions did not leave a permanent tendency to convulsions in the child. Children with rickets were very susceptible to influences that produced convulsions. Overfeeding, undoubtedly, often produced convulsions, and they might be serious. Quite a number of cases were on record in which the child died in a convulsion, and at the necropsy no cause could be found other than a stomach well filled with undigested food. Improper feeding might also cause convulsions in children. The giving to young children a little of everything, as was often done, was calculated to do mischief. The exciting cause in a large proportion of cases of convulsions in children could be found in errors in diet. Malarial poisoning might cause convulsions in children. Dr. Smith then referred to several cases which he saw with Drs. Lente and Murdoch of Cold Spring; all were apparently of the simple form of malaria, and all recovered. It was still a question whether the convulsions in that class of cases were produced by the poison itself, or by the high temperature, or by the sudden hyperæmia of the brain, supposed by some to

exist. A convulsion, occurring in the course of an acute disease, especially toward the close, was a grave symptom. A convulsion occurring in the course of whooping-cough was an unusually grave symptom, if unassociated with dentition or some disturbance in the alimentary canal. With reference to syphilis as a cause of convulsions in children, the author of the paper had found recorded cases of unmistakable congenital syphilis, in which convulsions occurred during the first three months of life; and he also referred to a case of that kind which came under his observation while an interne in Bellevue Hospital. Nervous excitability, which showed itself in a tendency to develop convulsions in childhood upon slight provocation, might, in later life, develop into epilepsy. It was fair to presume that, if a child had convulsions, and, later in life, had epilepsy, there already existed the pathological changes which resulted in epilepsy. It would seem almost impossible that functional disturbance of the nervous system could lead to such permanent changes in the central nervous system as were indicated by idiocy or permanent impairment of intellect, unless there existed, previously to the attack of convulsions, some lesion of the brain or spinal cord; and yet, upon theoretical grounds, it would seem just as impossible that such stormy outbursts as seen in convulsions should occur and not leave permanent injury. It would be interesting to know whether or not convulsions in children belonged to civilised life.

Dr. Smith considered the question of treatment under three heads: 1. The management of the attack; 2. Prophylaxis; and 3. The subsequent treatment.

Whatever the cause, whether due to organic disease or to functional disturbance, the convulsion should be arrested and another prevented by the administration of anæsthetics, preferably chloroform. As soon as the cause was found, it should be removed if possible. If the convulsions were due to pain produced by other than causes such as the pricking of a pin, tight abdominal bandage, which could be easily removed, and an overloaded stomach which could be easily emptied, opium was the most valuable remedy that could be used, and he would employ it if the child was *more than four months old*. The convulsions dependent on the pain of teething should be controlled first by opium, and second the gum-lancet. The effort to lance the gums before the pain was subdued by opium or a similar agent, probably would cause another convulsion. Convulsions dependent on the pain produced by worms or other foreign bodies in the intestinal canal, or by errors in feeding, should be first controlled by opium, and then a cathartic should be given. Convulsions produced by worms were not always attended by pain. The cathartic and opiate might be combined

with advantage. If there were reason to believe that the source of irritation was in the rectum or near it, and an enema were indicated, an opiate should be given first, and when its influence was secured sufficiently to control the convulsion, then the injection might be given.

Convulsions due to malarial poison, although not preceded by pain, yielded more promptly to opium, than to any other agent. Having controlled the paroxysm, put the child fully under the influence of quinine for the purpose of preventing its recurrence. The tolerance of opium was sometimes very great in that class of cases, as well as in all others in which its use was indicated.

With reference to lancing the gums, Dr. Smith believed that if they were swollen and hot they should be lanced. Further, if it were time for the tooth to appear, he believed the gum should be scarified; for the irritation was due, not unfrequently, to deep-seated pressure such as could not manifest itself upon the surface. Whatever theory might teach, it seemed to him that from clinical observation it was conclusive that lancing the gums was followed frequently with marked relief.

As, in the great majority of cases, opium was indicated, the mother might, with safety, be told to give the baby, *over four months old*, paregoric, with explicit directions concerning the size of that dose; to be repeated every half hour until the convulsions either were controlled or a physician had arrived. If the child were under four months old, Dr. Smith prescribed a teaspoonful every hour of a mixture of bromide of potassium and chloral with bicarbonate of soda, of which each dose contained one grain of each remedy. It was conveniently given in warm sweetened water. Double the quantity might be given every hour or two hours to children from six weeks to four months of age, according to the frequency and violence of the convulsions.

Dr. Smith rejected the hot bath in the treatment of convulsions of children; for almost invariably the child had one or more convulsions while in the bath—the very agitation incident to the giving of it adding to the excitement of an already disturbed nervous system. The object in treatment was to keep the nervous system as free as possible from agitation; hence, he forbade the hot bath, insisted that the child should not be restrained while in a convulsion, that it should be placed on a bed that did not creak, that the room should be kept perfectly quiet, have plenty of fresh air, be partially darkened, contain only one person at a time, and that opening and shutting of doors should be avoided. Over-active treatment was uncalled for, if not positively dangerous.

Dr. Smith then spoke of the sedative effect of the bromides, and of the value of maintaining it in cases in which the prolonged use of opium was undesirable. He believed that the intense itching, which especially followed scarlet fever and measles, might be the cause of convulsions in young children, and in those cases the bromides acted most favourably. In occasional cases the bromides aggravated the symptoms. Under such circumstances chloral might be used. To control convulsions dependent on high temperature, he recommended veratrum viride. Its tendency to promote vomiting might be controlled by combining it with opium. Two drops of the tincture might be given every hour to a child from six to eighteen months old. If it produced vomiting no harm was done, for the pulse and temperature then usually fell and the convulsions ceased. If the remedy failed to control the convulsions, the cold bath was indicated. Coma was quite frequent in that class of cases, and the child was then in imminent danger. The temperature must be reduced, and the cold bath was the most efficient means that could be employed.

The sedative action of calomel, especially in convulsions occurring at the onset of an acute pulmonary affection, was then mentioned with favour.

Under the head of prophylaxis, Dr. Smith referred to the proper care of the mother during pregnancy, especially with reference to proper exercise, food, amount of sleep, condition of bowels, and all that pertains to diminishing the tendency to nervous disturbances in the child.

Prophylaxis in the child was suggested by a study of the etiology of the convulsions. The object to be accomplished under the third head, or treatment subsequent to the attack, was to remove causes and predisposing causes, and keep the child in the best possible physical condition.—*London Medical Record, July* 15, 1880, *p.* 265.

ADDENDA.

80.—ANNOTATIONS ON ANÆSTHETICS.

By Samuel Osborn, Esq., F.R.C.S., Chloroformist to St. Thomas's Hospital.

The three anæsthetics in general use in St. Thomas's Hospital are nitrous oxide gas, ether, and chloroform, arranged in their order of strength, it being necessary to employ one or other, according to the length or variety of operation, or age of patient.

Nitrous oxide gas is used solely for dental operations, where the extraction of teeth, and such operations of short duration, can be performed within the space of seconds, for a prolonged use of this anæsthetic is dangerous, and therefore not applicable to any operation of magnitude.

As a rule, chloroform is administered to children under five years of age, and to adults above sixty; ether to all persons intermediate between those ages. The chief reason for which is this, that ether is given in all possible cases because of its undoubted greater safety. Ether, moreover, causes an increase of the heart's action, whereas chloroform decreases the same.

Chloroform is administered to old people because the inhalation of ether produces hyperæmia of the bronchial passages to so great an extent that a fatal termination is not unfrequently the consequence. In children the same remark applies, but in reality they take any anæsthetic so remarkably well that either may be used without preference.

The process of anæsthesia may be divided in three stages, the first being that of cerebral excitement or loss of consciousness, the second accompanied by loss of sensibility, and the third by loss of motion. Beyond this it is not necessary to go, the final stage being one of total paralysis of all nerve centres. Generally speaking, the second stage is sufficiently profound for most operations. Instances where the third stage is essentially necessary will be described under the heading of administration in special cases.

Preparation prior to the giving of anæsthetics may be divided into ordinary and special preparation.

In ordinary preparation, no food should be partaken of for four hours previous to the giving of the anæsthetic, and the food then taken should be finely minced or in a liquid form, so that digestion may be thoroughly completed and the stomach

empty. If this is not carried out more or less sickness is the consequence.

Patients prior to operation are in a high state of nervous excitement, and the function of digestion is consequently retarded, and so, by having the food minced, digestion is completed more rapidly.

Special preparation is called for in patients weakened by long suffering, such as those affected with cancer, long-standing cases of necrosis, and who may be characterised by the general term anæmic. These are the cases in which anæsthetics must be given with extreme caution, for from amongst these are usually to be found the fatal cases. A previous course of the most nutritious diet, accompanied by the administration of tonics, or, in other words, a feeding up prior to operation must be resorted to.

If chloroform is to be administered, brandy-and-water may be given beforehand, but no alcohol of any description should be given before the inhalation of ether.

In some cases it is found necessary to give an enema of egg-and-brandy during the operation, for when the patient is under the influence of an anæsthetic, the passage of fluid by the mouth is attended with danger.

When it is necessary to have a patient insensible during an operation, *always have the anæsthetic given by some one who is in the constant habit of administering it, and who will attend to that solely.*

The patient, having been prepared, should be placed upon his back on the operating table, with the head slightly raised and all constriction by tight garments removed from the neck, chest and abdomen. False teeth should be removed, and patients always asked prior to the commencement of administering the anæsthetic whether they have done so, as cases have occurred where, by some mishap, the teeth have become detached, and falling into the larynx have occasioned fears of asphyxia.

The warmth of the body should be kept up by being covered with a blanket, as in these days, when operations are mostly performed under the carbolic spray, the condensation of the steam occasions both damp and cold. Also the breathing of the patient should not be interfered with by the carbolic spray more than can be helped, the ether being already a sufficient impediment to the breathing.

When commencing any anæsthetic, the first inhalations should be freely diluted with air, and the patient gradually brought under the influence, for large quantities suddenly placed over the patient's mouth occasion gasping and struggling for breath.

When food is in the stomach patients are longer in getting under the influence of the anæsthetic, but as soon as vomiting

has taken place they speedily become insensible. Sickness in the true sense of the term, or the bringing up of the contents of the stomach, seldom occurs when patients have been properly prepared. In some cases, even when food is withheld as long as recommended, sickness occurs, on account of digestion not having taken place, this being due to nervous influence consequent upon the impending operation. Vomiting is more frequent after chloroform giving than after ether, its excessive sweetness being the cause. Ether in its evaporation produces much irritation of the buccal and bronchial glands, and consequently the secretion of the respiratory tract is largely increased, and flowing into the stomach is sooner or later ejected, or collecting at the back of the fauces, has to be removed. If the patient's head be inclined to one side, so that the saliva can partially run away by the angle of the mouth, this is lessened, for according to the amount of saliva swallowed will be the amount of frothy vomit to be afterwards ejected. Pallor of face frequently precedes vomiting, and may occasion some anxiety, the colour returning as the act of vomiting is consummated. The alternating contraction of the abdominal muscles is the principal sign of impending vomiting, and if the anæsthesia be slightly increased, this can be subdued.

To know when the patient is sufficiently under the influence of any anæsthetic for the operation to commence, the conjunctival surface should be touched with the tip of the finger, and if no reflex action takes place, shown by the contraction of the orbicularis palpebrarum muscle, a sufficient degree of insensibility has been produced. In certain cases, which will be subsequently mentioned, it is not necessary to have even so profound anæsthesia as the above. When the patient is fully under the influence, he should not be moved about more than is possible.

The skin is undoubtedly the most sensitive part of the body, and much more so than the deeper structures or internal parts. The primary incision and the final passing of the sutures being more painful than the sawing of bone or handling of intestine, it behoves the chloroformist to have complete anæsthesia at the two extremes of an operation. This deficiency of sensibility in handling intestine is frequently noticeable in the operation of ovariotomy. An exception to this indifference of internal parts is seen in the washing out of the bladder after lithotomy or in the operation of lithotrity, both of which are extremely painful.

Chloroform (prepared with methylated spirit, and manufactured by Messrs. Wright, Layman, and Umney) should be largely mixed with air, and for this reason it is best administered on a piece of lint folded into a cone to fit over the nose

and mouth, whereby a free admixture of air is allowed. When, in January, 1876, I communicated to the British Medical Journal the mode of administering chloroform at St. Thomas's Hospital, I then stated that Millikin's modification of Snow's inhaler was the one in general use. This inhaler I used for a long time and was well satisfied with it, but I consider the administration of chloroform on lint to be far safer, as a sponge holds too large a body of chloroform, and the quantity placed in the instrument must be accurately measured.

Ether is given with Mr. Clover's apparatus, as manufactured by Messrs. Mayer and Meltzer, of 71, Great Portland Street. Having used this apparatus for some time I can confidently recommend it as being in my opinion the best, both as regards safety and comfort of the patient. It also consumes less ether. It is undoubtedly the least disagreeable to the patient, for any one having experienced a trial with this inhaler and another, has always given the preference to the one in question. The reason lies in the fact that the inhalation of their own expired air is gradually and imperceptibly changed to one heavily charged with ether, whereas other forms of apparatus necessitate a large volume of ether to commence with, which, after having been poured upon the sponge, in its evaporation lessens in degree instead of increasing in force. The sensation of the inhalation of ether to many patients is that "of its running down their throats."

The amount of ether (sp. gr. ·735, manufactured by Messrs. Burgoyne, Burbidges & Co., of Coleman Street) put into the cylinder, and which is sufficient for the longest operation, is about four ounces. This amount is frequently not used, but the cylinder should be thoroughly emptied and refilled prior to the commencement of each operation. Care must be taken that the sides of the india-rubber bag are not adherent to one another at the insertion to the cylinder, for without the air passes freely to and fro from the bag, the patient is longer in coming under the influence.

The administration of anæsthetics for eye operations is more dangerous than that for other operations, the reason being that very deep anæsthesia has to be produced before the conjunctiva will remain insensible throughout the whole of the operation. In the removal of cataract, where coughing or struggling at the critical moment of extraction of the lens may spoil the whole operation, it is better to give ether first, and subsequently follow it up with chloroform. In the reduction of dislocations the administration of chloroform is always required. Ether may be primarily given, and subsequently chloroform, but the former alone does not produce a sufficiently prolonged paralysis of the muscular system for the accomplishment of the reduction.

Ether usually causes first a failure in the respiration, whereas chloroform causes first a failure in the pulse.

Ether may be given as an accelerator of the heart's action; this was well shown in a little child being operated upon by Mr. Sydney Jones. The child's pulse failed three or four times under the influence of chloroform, and necessitated its discontinuance. Ether being substituted, the heart regained its strength, and the operation was safely conducted. I have since, in other cases, administered ether as a stimulant to the heart when symptoms of its decreasing power have occasioned alarm.

In cases of threatening asphyxia never trust solely to thrusting the lower jaw forwards, but forcibly draw the tongue out of the mouth by forceps. Artificial respiration, after Silvester's method, must be immediately commenced and carried on until all hopes of recovery are at an end. Whether air enters the lung can be determined by the more healthy appearance of the face, as well as by hearing the air passing freely to and fro. Œdema, or spasm of the glottis, or obstruction in the trachea, must be met by immediate tracheotomy, and patients have been frequently saved thereby. From observations lately made by Dr. Howard (Lancet, May 22), it is probable that traction upon the tongue has no effect in raising the epiglottis; therefore if traction upon the tongue does not relieve the threatening asphyxia, by allowing a freer current of air to enter the lungs, tracheotomy must be immediately performed. The venous congestion is also relieved by opening one of the external jugular veins, and at the same time, as a good current of fresh air is allowed to reach the patient, the skin may be stimulated by flicking the chest with the wet corner of a towel.

Such is the treatment of threatening asphyxia, the diagnosis of which from one of syncope is of the greatest importance, as the remedies applicable to the latter materially increase the symptoms of the former.

In threatening syncope the feet of the patient should be raised and the head lowered, with the limbs bandaged, so as to keep the blood in the centre of the body. An intermittent action of the galvanic current should be applied over the region of the heart or subclavian triangle, and the vapour of ammonia or, better still, ether, applied to the nostrils. As a *dernier ressort* electro-needle puncture of the heart may be tried, but its success is questionable.

In conclusion I would impress upon all surgeons these main points in connection with the administration of anæsthetics:

1. Always have the anæsthetic given by some one who is in the constant habit of administering it, and who will attend to that solely.

2. Never administer anæsthetics unless absolutely necessary.

3. Neither ether nor any other anæsthetic is absolutely safe.
4. Never keep a patient under the influence of any anæsthetic longer than is absolutely necessary.—*St. Thomas's Hospital Reports, Vol.* x., *p.* 49.

81.—ON ETHIDENE-DICHLORIDE.

By J. T. Clover, Esq., F.R.C.S., &c., London.

Since the beginning of last year, when attention was drawn to this substance by the investigations of the Glasgow Anæsthetics Committee of the British Medical Association, published in the British Medical Journal, I have made use of it in hospital and private practice in almost every case requiring longer anæsthesia than that of nitrous oxide gas. I have for some time been intending to publish my experience with it, and will delay no longer, as the advantages of using it are very evident; and it is right that its objectionable properties should not be concealed or too lightly treated, especially now that the warmer weather will increase the potency of all anæsthetics of this kind.

Ethidene-dichloride (CH_3, $CHCl_2$), as it is now found in the market, has not an uniform boiling-point. It can be divided by fractional distillation into two or more substances. That which I have lately been using has a specific gravity of 1225, boils at 115°, the temperature rising to 140°, at which it boils steadily and is nearly all dissipated. I am told that there are greater difficulties in the way of procuring the dichloride now than last year, in consequence of the waste-products in the manufacture of chloral, from which it was made, having been used up. At all events, the price has more than doubled within a year, and some of the samples I have examined have had a disagreeable after-odour. Hitherto it has nearly all been imported from Germany; but some of our English chemists are trying to make a purer drug, and I hope they will succeed.

Ethidene-dichloride mixes freely with alcohol, but only slightly with water—enough to flavour it only, but less than chloroform, which it resembles in taste and smell. It is less inflammable than alcohol. A piece of paper saturated with it does not readily take fire; but air passed through the liquid takes up a vapour which makes it burn at a jet like coal-gas.

The total number of cases in which I have administered it is *one thousand eight hundred and seventy-seven*. Of these, two hundred and eighty-seven have been major operations in surgery, including—

Amputation of breast	.. .. ..	17 cases.
Excision of tongue...	.. .. ..	7 ,,
Excision of rectum..	.. .. ..	4 ,,

Lithotomy	7	cases.
Lithotrity	83	,,
Stricture	6	,,
Excision of eye	8	,,
Cataract	15	,,
Iridectomy	14	,,
Squint...	23	,,
Excision of tumours	27	,,
Excision of jaw	7	,,
Fissure of palate	5	,,
Hemorrhoids	44	,,
Fistula	16	,,
Colotomy	4	,,

The remaining 1,565 cases were of minor surgery, and the extraction of several or of difficult teeth; and these latter cases have put to the test the qualities of the drug, inasmuch as one administers at a disadvantage.

The table shows an experience sufficiently large to form a judgment of its use. Although, so far, my experience has been without a fatal case, I have sometimes noticed a depression of the pulse which has alarmed me; and I will to-day relate a case in which, during a struggle at the commencement of inhaling ethidene without nitrous oxide, the patient's heart suddenly failed, and he died. Although the disease of the heart was found sufficient to account for death, it was connected with ethidene, and its reputation for safety will suffer.

My usual plan of giving it is by first getting the patient nearly unconscious by means of nitrous oxide gas, and then gradually adding the vapour of ethidene. The general features of an administration are that the patient falls asleep, without moving a limb; a little convulsive twitching is seen, and then stertorous breathing; the pupils at first dilate, about the same time that stertor commences; a very little air is now given at every third or fourth respiration, and the pupil contracts. The quantity of ethidene is regulated according to the condition of the pupil or the unsteadiness of the patient, the pulse usually remaining much less affected than when the same narcosis is produced by chloroform. The anæsthesia usually continues some time after consciousness returns, and the patient awakes almost as from natural sleep, speaking clearly. The dreams are usually pleasant, often of rapid travelling or music, and if one whistle or sing, it often guides the dream in this direction. The patient, within two minutes of being in the most profound sleep, if it have lasted only a short time, will get up and walk steadily. The non-interference with muscular co-ordination is equally striking in the act of talking. Vomiting has occurred in about one-third of the cases of major surgery, and in about

one-twentieth of the minor cases. It is more likely to occur if the vapour have been strong enough to excite swallowing. Without exception, the vomiting has ceased sooner than it usually does after chloroform. You had an opportunity last week of seeing what it can be made to effect in a difficult operation on the mouth. A little delicate child, aged nine, was kept asleep an hour and a half, perfectly quiet, without vomiting, and even without coughing, except when the blood tickled the throat. The other severe operations on the jaw and tongue have been also very satisfactory. A private patient of Mr. Heath, and another of Mr. Hill, each had the tongue removed; the quietude during the operation and the rapidity of recovery being remarkably good. I think the most triumphant anæsthetic case I ever had was that of a patient of Mr. Durham, who removed a large malignant tumour of the palate, together with a group of indurated lymphatic glands, from the neck. Anæsthesia was perfectly sustained for an hour and a half; the patient awoke in capital spirits, and made a rapid recovery from the effects of the operation. Unfortunately, it sometimes depresses the heart's action. I have been seriously alarmed by this, and have been obliged on three occasions to lower the patient's head and induce artificial respiration. By this means, recovery has been so easily affected that I hoped that, by being on the watch for failure of circulation, it would be possible to keep the patient always safe. However, some persons have a tendency to faint from various causes; some from particular smells, others from fear. I once saw a patient fall down on the floor of my room, and thought him dead; on recovering, he told me it was the sight of a pair of common dissecting-forceps I held in my hand which had frightened him, and that he had had similar attack when looking over a hospital on the continent. And then there is true fatty degeneration, which cannot always be diagnosed.

Case 1.—A lady, about 60, had lost blood from a vascular growth of the urethra. Within the first two minutes of inhaling, I felt the pulse become small, and removed the inhaler at once. She continued breathing regularly fifteen or twenty times, then the breathing intermitted; the pulse was now imperceptible. I used artificial respiration. She recovered in two minutes; the pulse remained feeble; but I kept her insensible by occasionally giving the dichloride during the operation.

Case 2.—A gentleman, aged 30, was about being operated on for fistula. I gave nitrous oxide till he was stertorous, adding ethidene carefully. The pulse becoming small, I allowed fresh air for three inspirations. He then became delirious, and struggled, passing quickly into a state of opisthotonos. I allowed air till he had so far recovered as to speak, and then

renewed the ethidene. As he became stertorous, I noticed the pulse become intermittent and stop. I removed the inhaler; the breathing continued to be free and regular. In about twenty seconds, the pulse returned; the patient awoke in five minutes in glorious spirits, though covered with perspiration. No vomiting followed.

Case 3.—An old gentleman had lost blood for a long time from piles. At first, I had difficulty in making him breathe regularly. At last, he commenced panting very quickly. As he began to snore, I noticed the pulse begin to fail, and it stopped. I drew his head to the edge of the bed, allowed it to fall back, and drew forward the tongue with my long finger passed into the pharynx. Artificial respiration was carried on for two minutes, when he recovered. He was put again in position, and I continued to keep him insensible by ethidene during the operation. In five minutes after it was over, he expressed his satisfaction in the liveliest manner.

In the first and third cases, I believe that the percentage of ethidene vapour was higher than usual, and that the rapidity of their recovery showed its superiority to chloroform. But it must never be forgotten that it cannot be used with the same freedom as ether may be.

I have now to mention a case of cardiac syncope, which terminated fatally.

A man was about to have an operation performed for hemorrhoids. He was palish from the loss of blood which had been going on for six months. He was in the wine and spirit trade, and had lately had a carbuncle; otherwise, there was nothing particular in his history. The heart-sounds were normal. He had not eaten or drunk anything since the previous night. Laughing-gas had not acted satisfactorily, when he took it to have a tooth extracted. He struggled a good deal, and felt the pain, he said.

Being placed on his right side with his knees drawn up, dichloride of ethidine was administered with the gas and ether-inhaler. He did not respire regularly at first; but he never coughed, and was not observed to swallow. After twelve or fourteen respirations, he talked, and commenced to struggle. The face-piece was then removed for a little distance from the face, to allow him to breathe some fresh air. The struggling and convulsive movement which followed interfered with the precise observation of the state of the pulse; when these had ceased, there was hardly any pulse, and it soon disappeared; but he continued to breathe ten or twelve times in a satisfactory manner, and then a pause was noticed between the respirations. His head was immediately extended backward and downward over the edge of the bed, and the tongue drawn forward, whilst

the feet were raised, and artificial respiration commenced. This, in about a minute, restored him so far as to cause him to try to speak in an indistinct manner, as a patient often does just before waking up. The pulse became distinct, all danger seemed past, and he was again placed in the position for operating. In doing this, he seemed to raise his head voluntarily, and some more of the anæsthetic was about to be given, when the pulse was again noticed to be failing. Without loss of time, the artificial respiration was recommenced as before, and, during the first three minutes, there were several natural gasping inspirations. but the pulse was never felt again. The case becoming desperate, an opening was made through the crico-thyroid membrane into the larynx, and a silver tube introduced. Air was blown through the laryngeal tube, during artificial inspirations, for three-quarters of an hour, after which it became evident that further attempts were useless.

The *post mortem* examination, made by Mr. Samuel Lloyd of Bloomsbury, revealed a large flabby heart, with the usual amount of fat on it; the substance seen on section, of pale tint mottled with yellow, having the ordinary appearance of fatty degeneration. The lungs were a little emphysematous, and congested posteriorly, but fairly crepitant. The spleen was friable; other organs healthy; the liver rather large.

The heart was carefully examined by Dr. Crosby, who wrote the following notes of it. "The apex of the heart, including the extremities of both ventricles, was covered with a layer of fat five-eighths of an inch in thickness, which mingled with the muscular wall so as to render it difficult to define where one ceased and the other began. The microscope showed the muscular tissue at this part to have undergone extensive degeneration, whole fibres consisting of strings of fat-globules, displacing the true sarcous elements. At other portions, where to the unaided eye the muscle appeared fairly healthy, abundant deposits of oil-globules existed.

Remarks.—With reference to this sad case, the first question is, What was the cause of death? It was clearly one of cardiac syncope, the breathing continuing for some time after the circulation had stopped. It could be accounted for, first, by supposing the administration of an excessively strong dose of the anæsthetic; secondly, by exhaustion of a weak heart in consequence of violent effort; or thirdly, by the inefficiency of the heart's action, produced by advanced fatty degeneration. Such a heart as we found was ready to cease beating from comparatively slight causes. He had inhaled but a small quantity of the anæsthetic, and for a short time. Holding the head in a depending position, with the feet raised, and ten or twelve artificial respirations, were followed by a gasping inspiration,

his pulse became regular, and he commenced speaking. Had the syncope been produced by a large dose of dichloride, the pulse would not have so soon recovered on lowering the head. If recovery of the heart's action had been brought about by the artificial respiration dissipating the vapour from the chest, and so supplying the heart with purer blood, the heart once fairly started again, would probably have continued to act. Nevertheless, as death was probably the result of several factors, may not the depressing effect of ethidene have made the syncope fatal, which under gas or chloroform or ether, might have been recovered from? What we know of the stimulating effect of ether would lead us to conclude that it would have been safer, but the struggling produced by ether would have been dangerous in this particular case. Had chloroform been used, and the same struggling occurred, the chances of resuscitation would have been less. The case shows how very important it is to watch the pulse as well as the breathing. The respiration was effectually performed some time after the pulse ceased to be perceptible. If the inhaler had been applied until the breathing showed signs of danger, the restoration of the circulation, which unfortunately was for a brief time only, would not have occurred at all. In any case where the pulse is observed suddenly to fail, I would not only remove the inhaler from the face, but use a towel or some kind of fan to blow the vapour away from the patient's lips, and I would also assist the natural respiration by gentle pressure on the sternum during the respirations. Seeing, also, that raising the patient to a position for operating was quickly followed by syncope, I would, in a similar case, keep the head dependent until recovery were complete, in spite of the disadvantage of having a struggling patient to deal with.

Some may ask whether the failure of the heart might not arise from the stoppage of blood in the lungs, through their not being supplied with oxygenated blood. My reply is, that the circulation was restored, and the patient's lips became of almost natural colour when he was put back in position for the operation, and the inhaler was not again applied. Moreover, in giving gas, ether, or ethidene, I have always excluded air, upon the same principle, until voluntary struggling has ceased; and these cases in all exceed twenty thousand, amongst which not a single death occurred.—*Brit. Med. Jour.*, *May* 29, 1880, *p.* 797.

82.—ON BROMIDE OF ETHYL, OR HYDROBROMIC ETHER.

By Dr. Marion Sims, New York.

In the New York Medical Record Dr. Marion Sims publishes a paper on Bromide of Ethyl, or Hydrobromic Ether (C_2 H_5Br.)

He traces the history of this substance, which, he thinks, is coming rapidly into common use. It has been given two hundred times in Philadelphia, and is greatly lauded by all who have used it.

Dr. Sims's first trial was not successful; the lady was very excited for eight minutes, and then he discontinued it and gave ether. On the next occasion it was poured on a folded handkerchief, and laid in contact with the mouth and nose, and held there firmly by a towel folded into a square of ten inches. The patient was anæsthetised in two minutes. The operation lasted five minutes, and she recovered consciousness in two or three minutes more.

Dr. Sims now relates an important case, which would have been a severe test for any anæsthetic. It was that of a lady, aged 25, subject to epilepsy for five years, on whom he performed Battey's operation. A drachm of bromide of ethyl was poured on a folded napkin, and held closely over the nose and mouth. In one minute another drachm was poured on it, and at the end of two minutes she became insensible and relaxed; but the conjunctiva was sensitive, the eyes rolled about, and her breathing was rapid. At the end of five minutes she was perfectly insensible, breathing sixty times a minute. The rapid breathing ceased on removing the napkin, and increased on giving fresh bromide. At the end of ten minutes she could be kept quiet; breathing quietly, but always above the normal standard. Pulse 86, full and strong. During the first twenty minutes, two ounces of bromide had been used. She then vomited. At forty minutes, she again vomited and strained. Three times during the operation there was opisthotonos, with twitching and rigidity of the extremities and constant rolling of the eyes. The operation lasted an hour and a half. The condition was good the whole time; the pulse strong and full. The rapid breathing was peculiar, and the conjunctiva continued sensitive the whole time, whilst the eyeballs were in constant motion. There was no unusual dilatation of the pupils. About 4½ ounces of bromide of ethyl were used. She quickly recovered, but had the most distressing retching and vomiting. She had constant headache, for which a fourth of a grain of morphia was injected under the skin. In an hour this was repeated, and again a third time. Three hours after the operation diarrhœa commenced. The stools were watery, brown coloured, and smelt of the bromide. Hiccough occurred five hours after the operation. The diarrhœa continued of the same character. At 7 a.m. the pulse was imperceptible. There was no pain except in the head. She was somewhat restless. The diarrhœa seemed insufficient to account for the prostration. At 11 a.m. she had a severe convulsion with frantic raving. She died twenty-one hours after the operation.

At the *post-mortem* examination, two and a half ounces of bloody serum was found in Douglas's pouch. There were no signs of peritonitis. The lower part of the ileum was dark-brown in colour, and congested. The colon was of the same colour; the kidneys were healthy.

Dr. Marion Sims thinks that death was caused by cholerine, but that this resulted from the bromide. The patient was under its influence an hour and a half. She complained of her head from that time. Her eyes were congested, and she had convulsions before death. The odour of the bromide was very apparent on examining the intestines twelve hours after they were removed from the body.

Dr. Sims has seen two deaths from etherisation where no disease of kidney was suspected till fatal coma was produced by the ether; and on careful examination, the kidneys in this case were found to be affected with acute catarrhal nephritis. It appears from the report that only five ounces and a drachm of urine were drawn off during the twenty-one hours which elapsed before death. He therefore thinks that the anæsthetic was the cause of death, while the manner of death may have been by uræmic poisoning, and he concludes that the lesson to be learned is, that bromide of ethyl should not be given in prolonged operations, and never where there is organic disease of the kidneys.

The fact that the operation lasted an hour and a half shows that it was one of unusual difficulty, and probably there was considerable loss of blood. The pulse kept up well under the influence of the bromide, and the effect of the loss of blood was not seen till the stimulant effects of the anæsthetic passed off. The same occurs sometimes when ether is given.

With respect to the unpleasant odour, we must not forget that the smell of ether was at first thought very objectionable by nurses and patients in the same ward as a patient who had inhaled it. We should soon be reconciled to an odour, however nauseous, if we associated only good consequences with it. A vapour decidedly safer and quicker in action than any other, would find favour in spite of its smell. Experiments of its prolonged use on animals should be made, otherwise the experience of this case scarcely justifies its repetition. It may be useful for slight cases, though unsuited for long ones. The variability of the odour of different samples pointed out by Dr. Marion Sims is perhaps due to the tendency of the liquid to decomposition; and this will probably be an insuperable objection to its general use. It would be worth trying to keep it in small bottles, containing no more than might be consumed the day the bottle was opened.—Mr. J. T. Clover, *London Medical Record, June* 15, 1880, *p.* 213.

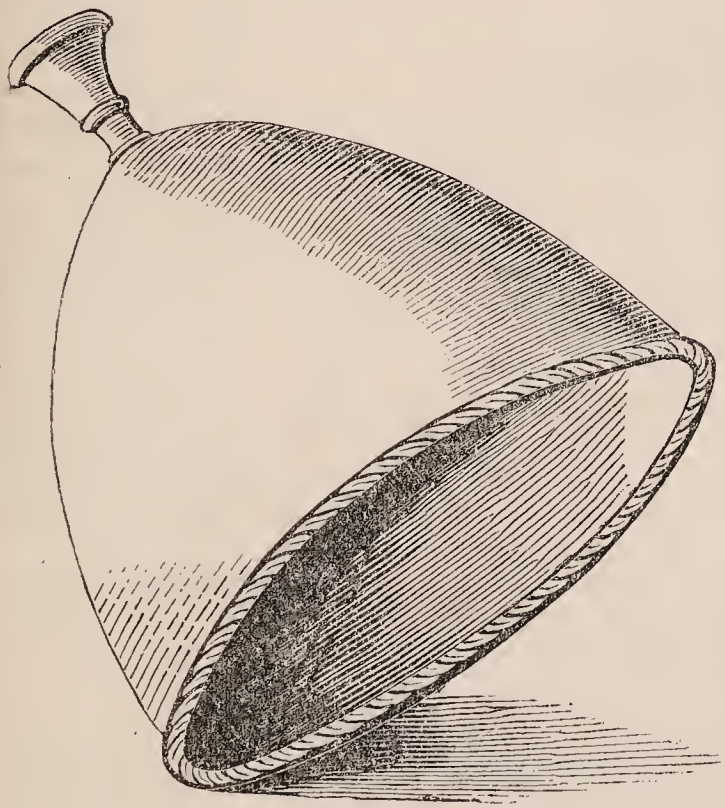
83.—DESCRIPTION OF AN INDIA-RUBBER INHALER FOR ETHER ANÆSTHESIA

By B. Wills Richardson, Esq., Senior Examiner in Surgery, R.C.S.I., Surgeon to the Adelaide Hospital, Dublin.

In the Dublin Journal of Medical Science for March 1873, I published a description of a metallic ether inhaler of simple construction and portability. But subsequently finding it rather expensive for general use, I devised an inhaler of india-rubber, which works efficiently, economises ether, and may be purchased for a few shillings.

This inhaler the Messrs. Fannin had constructed for me many months ago, and since then, I may say, it has been used with almost every operation case in the Adelaide Hospital.

Fig. 1.



When first made, the inhaler had no funnel. This I have recently added to avoid the necessity for raising the inhaler from the face to replenish the ether. By this addition anæsthesia may be either hastened or maintained with facility and ether still further economised.

The inhaler is conoid in shape and formed of vulcanised rubber (Fig. 1), and may be of different dimensions. The measurements of the one I use are as follow: Diameter at mouth, 9 inches; vertical axial depth, exclusive of the funnel, 7 inches; depth of funnel, $2\frac{1}{4}$ inches; the diameter of its mouth being about 1 inch.

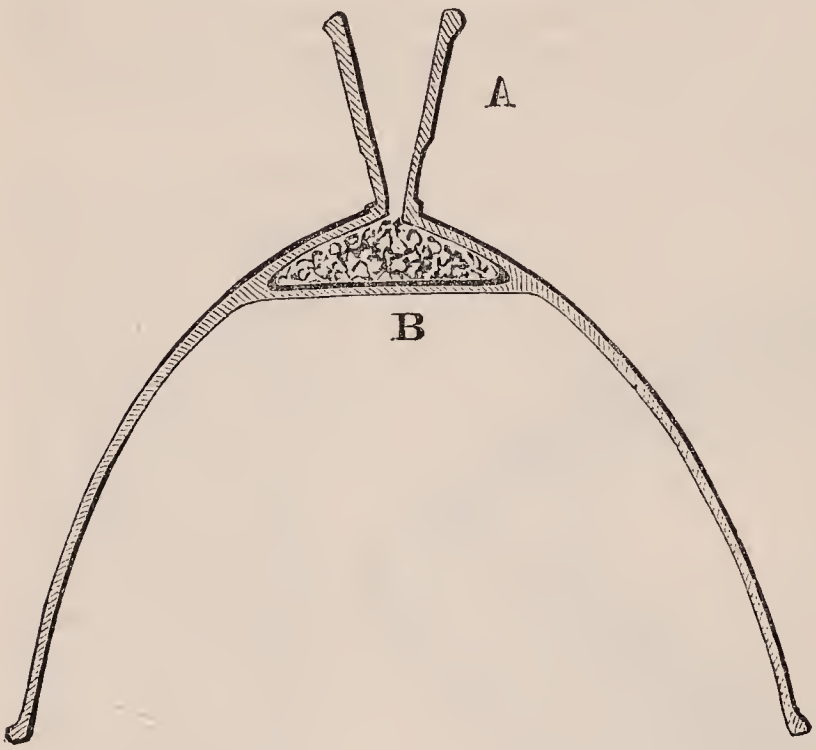
Near the top of the inside of the inhaler two crossed bands of rubber are cemented as seen at B, Fig. 2. These are to retain a piece of sponge in position as seen in the drawing. The sponge receives the ether through the funnel, the walls of which should be of some substance, but yet sufficiently thin to allow of its easy closure by finger pressure, should it be desirable to prevent air passing towards the sponge.

I myself generally close the funnel after each ether renewal, until near the conclusion of the inhalation, when I allow the air to enter.

I need scarcely remark that air will enter the inhaler at its base; this I limit by taking up a fold of the rubber with the fingers.

For these antiseptic days a rubber inhaler possesses a great advantage in the facility with which it can be cleansed, which should be done after each inhalation.

FIG. 2. SECTIONAL VIEW OF THE INHALER.



In the paper in the Dublin Journal to which I have alluded I wrote as follows, in speaking upon the relative safety of chloroform and ether as anæsthetics:

"I confess that I am myself in favour of a mixture of equal parts of chloroform and spirit of wine for producing anæsthesia, and therefore it is the comparative safety of this fluid I purpose testing against the ether."

A. Funnel.

B. One of the bands, above which the sponge is represented.

Since those lines were written I have altogether relinquished the use of chloroform from the serious medico-legal position into which its fatality has plunged it.

To me it is a matter of surprise, considering the numerous deaths attributable to chloroform, that its use is not more limited.

"Although deaths," as I wrote also in the paper referred to, "it must be conceded have resulted from the inhalation of ether, I will, notwithstanding, reproduce here the following observations of Snow regarding the safety of ether, as an inducement for the trial of ether by those who are not disposed to do so in consequence of their having had good luck in the use of chloroform."

"I believe," he has recorded, "that ether is altogether incapable of causing the sudden death, by paralysis of the heart, which has caused the accidents which have happened during the administration of chloroform. I have not been able to kill an animal in that manner with ether, even when I have made it boil, and administered it quite pure." . . . "I hold it, therefore, to be almost impossible that a death from this agent can occur in the hands of a medical man who is applying it with ordinary intelligence and attention."

In conclusion I should state that the face and about the front half of the head should be covered by the inhaler, which, as I have already observed, may be folded to lessen the amount of air entering the cone.—*Med. Press and Circ.*, *July* 7, 1880, *p.* 6.

84.—ACETATE OF ALUMINA AS AN ANTISEPTIC.

By the Editor of the Medical Times and Gazette.

The expense and the want of durability of Lister's carbolic gauze have led to several attempts to replace the carbolic acid by other antiseptics. Of these, acetate of alumina, which was used as early as 1827 by Gannal for embalming corpses, and which has of late been introduced into surgery by Burow, Von Bruns, Billroth, and Maas of Freiburg, appears to deserve special attention. It has been largely tried in Professor Maas's wards since June 1879, and his assistant, Dr. O. Pinner, gives an account of its physical properties, and of the method employed and results obtained in its surgical application at Freiburg, in Nos. 12 and 13 of the Berliner Klin. Wochenschrift, 1880, from which the following remarks are abstracted.

The solution of acetate of alumina (for the salt is not stable in the solid form) is made by dissolving 1000 parts "colloidal alumina," prepared by the firm of Löwig and Co., Dresden, in 800 parts dilute acetic acid. The liquid is filtered after standing twenty-four hours, and contains about 15 per cent. of acetate. For antiseptic purposes much weaker solutions are required. Dr. Pinner finds that a 0·5 per cent. strength will prevent urine or meat infusion from putrefying, while 1·5 to 2 per cent. solutions will stop all movement in a bacterial liquid, as well as sterilise the bacteria, so that no multiplication of them takes place in tubes containing Pasteur's fluid, and carefully isolated. Dr. Pinner does not wish, however, to assert that the bacteria are actually *killed;* to effect this, much larger quantities of this or any other antiseptic than it is possible to use in practice are probably required, as well as exposure to high temperatures. His view of surgical antiseptics is "to create such conditions in the wound as to render the fungi innocuous, unable to cause injurious decomposition or

to penetrate the surface of the wound and enter the blood." The method of operating with acetate of alumina as an antiseptic, in accordance with these principles, is as follows :— The skin is first washed with 5 per cent. carbolic acid solution in the ordinary way, and dried. The reason for this is that acetate of alumina is not saponifiable. Carbolic acid has also to be used for disinfecting the instruments, as the acetate solution is so acid that it blunts and corrodes them. For every other part of the operation the acetate of $2\frac{1}{2}$ per cent. strength is alone used. Owing to the admixture of steam the actual strength of the spray which reaches the wound does not exceed 1 to $1\frac{1}{2}$ per cent. ; but this answers all purposes. The acetate spray never causes anæsthesia of the operator's hands, as carbolic acid is liable to do, but it makes them rather rough. Professor Maas uses catgut for ordinary ligatures, and Czerny's antiseptic silk for atheromatous vessels or for deep-seated or large arteries. The sutures and drainage-tubes are inserted in the ordinary way. For the dressing, the wound is first covered with "protective," and then with loosely folded pieces of gauze, which are pressed firmly over and around it. The gauze has previously been soaked for a long time in 5 per cent. acetate of alumina solution, and wet compresses of the same, one and a half to two metres long and about twenty centimetres broad, four times folded, are used to keep the dressing in its place. From four to eight such compresses are generally needed, the rule being, *e.g.*, for an excision of the knee, to carry the dressing from the lower third of the leg to the upper third of the thigh. The whole is covered with gutta-percha tissue to prevent evaporation, the edges being surrounded with strips of 10 per cent. salicylated wool. To keep everything in place a calico bandage soaked in $2\frac{1}{2}$ per cent. solution of the acetate is used. The dressing is changed on the first or second day after the operation, and then only every fourth or sixth day ; it has never been allowed to remain longer than the eighth day. On removal the compresses are found impregnated with the secretion from the wound, which has a sourish smell, and is rather more copious than when dry bandages are used, the moist compresses being more permeable ; on the other hand, wounds and the surfaces of stumps have a cleaner look. The healing of the wound takes an absolutely aseptic course. None of the diseases which complicate wounds under the old system (*accidentelle Wundkrankheiten*) occurred in any of Professor Maas's cases. In three cases it was noticed that the acetate of alumina spray exercised an astringent effect, and checked the capillary hemorrhage from the part which was being operated on. In this respect it is superior to carbolic acid.

The acetate of alumina bandage is cheaper than Lister's

carbolic gauze. The colloidal alumina is sold by Löwig and Co. at forty-five shillings the hundred kilogrammes, and dilute acetic acid is also cheap. The compresses can be used over and over again after boiling and re-washing, and they are easily prepared. They adapt themselves well to any part of the body, and can be made to exert an even, elastic pressure on the wound. Eczema never occurs beneath them. Dr. Pinner gives details in his paper of a number of severe operations treated by the above method with success. The acetate has also been used by Professor Maas for permanent irrigations. Professor von Bruns, of Tübingen, first recommended it for this purpose—"severe injuries, especially compound fractures, which come rather late under treatment, cases of extensive sloughing or great destruction of soft parts, or, in fact, any cases where it is difficult to apply an antiseptic dressing successfully, can be thus treated." It is best to begin with a $2\frac{1}{2}$ per cent. solution, and then to reduce its strength to 0·5 per cent., which is found to be strong enough to disinfect and deodorise perfectly.—*Medical Times and Gazette, May* 8, 1880, *p.* 506.

85.—ON A NEW ANTISEPTIC AND ANTI-NEURALGIC REMEDY.

By Archibald D. Macdonald, Edinburgh.

My desire is to spread some knowledge of an agent whereby at least alleviation of human suffering may be obtained; and if I succeed in satisfying you that it deserves a trial, especially as an anti-neuralgic remedy, my object will be amply fulfilled. The agent to which I refer is the stearoptene of peppermint oil, or menthol, which is a crystalline solid derived from the oil of the well-known member of the Labiatæ, mentha piperita, by long keeping or by being cooled to a low temperature. The American oil yields it at the freezing point of water: its chief source, however, is the Chinese and Japanese oil. The crystals seem, too, to come spontaneously from the oil, as both oil and crystals are sent into the market, and the Japanese oil, *as we get it*, yields little menthol. The menthol is imported as Japanese camphor, in small white crystals, which have the peppermint odour, and resemble sulphate of magnesia, which is said to be an adulteration of the Japanese sort to the extent of ten or twenty per cent. The specific gravity is less than water, as menthol, either in liquid or solid state, floats on its surface. An important practical point is this, that liquefaction and volatilization take place below the temperature of the body. Some put down this point at 97° or 97·7° F. A specimen which I tried volatized at 93·5°. If placed in an ordinary fire or gas jet, it is seen to liquefy and then burn with a smoky flame. Its

formula explains the smoky flame—carbon is in great excess. As to solubility, it only slightly dissolves in cold water; it liquefies slowly in water at 82° F.; quickly at 120° F.; but mostly remains even then as a separate layer. It is, however, very soluble in alcohol, ether, fixed and volatile oils, glycerine, and other solvents only of chemical importance. Two parts of rectified spirit, and one of water will make a 1 to 20 solution; but in rectified spirit alone 1½ minims will dissolve 1 grain of menthol. Of glycerine, 40 minims are required to dissolve a grain. The addition of water or alkalies precipitates menthol from solution. Chemically menthol occupies the position of an alcohol with the formula $C_{10}H_{20}O$—having in its composition four atoms more of hydrogen than ordinary camphor, and containing the radical menthyl. Hence, in addition to other names, it receives the names of menthylic alcohol, hydrate of menthyl, or hydrous menthene. When acted on by pentachloride of phosphorus the chloride of menthyl is formed, which I suppose, from its alcoholic derivation, to be a general anæsthetic.

Having thus sketched the physical and chemical properties of menthol, I now proceed to consider its *actions;* and

1st, *It is an Antiseptic Agent.*—This was the point from which any thought I have ever given to the subject arose. In the course of the spring of last year I had under consideration and experiment various antiseptics, and was, of course, eagerly watching for something new to turn up. Whilst thus engaged, my attention became fixed upon menthol. I immediately concluded that, *a priori*, menthol, being the homologue of thymol—a recognised antiseptic—might itself be an antiseptic; and this reasoning was further supported by the fact that the essential oils are themselves antiseptics. So that it only remained for me to show by direct experimental proof the almost already established conclusion to be based on substantial grounds. With this view I instituted three series of experiments, the methods and results of which I will now briefly describe.

In the first series I used as bacterial provender a fluid composed of potassic phosphate, magnesia sulphate, lime phosphate, of each 28 grains; white sugar and ammonia, tartrate of each 53 grains; distilled water 12½ ounces,—which is as nearly as possible Cohn's fluid plus the sugar. Into phial No. 1, I poured half an ounce of this fluid with 1 dram of water, and forty-one hours afterwards bacteria had appeared. Seven days later the liquid became quite cloudy and of a beautiful pinkish purple colour, and this I am led to believe is rather an uncommon bacterial phenomenon. I myself had seen blue, green, and yellowish tints, but no pink. In four days more the pink had deepened to carmine, and I then replaced nearly all the fluid by fresh "Cohn," when there was continued production of the

pink bacteria or bacterial secretion. The lapse of time has rendered the pink hue very dim; but I now show one portion of the fluid after being partially filtered through unglazed ware, and another portion which passed through the filter, both being still, after time and filtration, pinkish in colour. You have there an answer to the question, "Was the pink coloration due to pink organisms, or to a secretion by them?"—namely, that it was due to bacterial secretion only.

After this digression I mention *Phial* 2, ℥ i. of a solution of menthol 1 to 1000, with ♏ xx. of rectified spirit in the ℥ ss. of Cohn's fluid. Thirty-three days after—that is, thirty-one days fully after bacteria appeared in No. 1—Dr. Hamilton was kind enough to examine this for me, and he found "no putrefactive odour, and no living bacteria or other organisms."

Into No. 3 I put menthol 1 to 2000, under the conditions of the preceding case, and in twelve days the bacteria began to exhibit themselves, and continued *slowly* to increase. There was here, however, it will have been noticed, the fallacy of the presence of ♏ xx. of rectified spirit, and to eliminate this I placed in another phial rectified spirit ♏ xx. with water and Cohn's fluid to ℥ v. The result was, that in seven days bacteria appeared. In this and the two following series of experiments one-ounce phials were used, and the conditions of temperature and exposure to air, by only placing lightly on the mouths of the phials a little cotton wool to keep out the dust, were maintained among the members of each series for itself as uniformly as possible. The conclusions from this first series evidently are, that solution of menthol 1 to 1000 is a powerful antiseptic, and that at 1 to 2000 its powers begin to fail.

In another series of experiments I used ℥ ss. of beef tea, with ℥ i. of another solution added: No. 1 contained beef tea alone, and it was slightly putrefactive in fifty hours after being put up. In No 2 the other solution was of menthol 1 to 1000 + rectified spirit ♏ xxiii. Twenty days subsequently bacteria had begun to manifest themselves. No. 3 had menthol 1 to 2000, and in six days was slightly putrefactive; a phial with carbolic acid 1 to 500 "went" within the same time; and on the twentieth day my phial containing rectified spirit ♏ xxiii. in the beef tea was "quite hazy." The conclusion here is that there was decided antiseptic action in the 1 to 1000 menthol phial; but the fallacy of the presence of rectified spirit was not eliminated, as it showed almost the same result. Yet the series shows still the superior antiseptic power of the 1 to 1000 solution as compared with the 1 to 2000 or with the 1 to 500 carbolic.

In the last series which I mention, instead of Cohn's fluid or beef tea I used simple water with a small piece of beef in each

vial, and employed a slightly different plan of experiment. Phial No. 1 contained menthol 1 to 500; No. 2 had menthol 1 to 1000; and No. 3 carbolic acid 1 to 500. To each I added two minims of putrefactive fluid at the end of a week from commencing the experiment, with the following result:—In the case of menthol 1 to 500, thirteen days after the experiment was begun, Dr. Hamilton again took the trouble to examine for me, and found only some *dead* rod-shaped bacteria and micrococci. The menthol 1 to 1000 and carbolic acid 1 to 500 phials were actively putrefactive on the twelfth day. Again menthol is seen not only to prevent putrefaction, but is shown to have the power of arresting the putrefactive process after it has begun: it killed the bacteria—they were "found dead." Further, in this instance the 1 to 1000 solution of menthol possessed the power of a solution of carbolic acid twice the strength.

Now, I think that these experiments, added to the *a priori* reasoning on the recognised properties of thymol and the essential oils, as showing that there is room for the conclusion that menthol plays a very prominent part in the antiseptic action of the essential oil of peppermint itself; and further, that they bear out the proposition with which I began, that menthol is an antiseptic of considerable power. As far as practical results are concerned, I have no grounds as yet on which to go; and, candidly speaking, I expect that in this country at least menthol will be relegated to the antiseptic limbo of thymol; but in those eastern countries, India, China, and Japan, for instance, or even in America, where the objections of small supply and high price cannot apply, its use is more to be maintained. There is one point, however, which I must strongly urge. As I have before said, it is very volatile at and a little below the temperature of the body, and therefore, I think, well suited for penetrating into every nook and cranny of wounds which are already putrefactive, slaying the bacteria which have taken quarters there, and so rendering those wounds perfectly aseptic. In this way, at any rate, would I claim some use for menthol, and some more extended application for much-neglected thymol.

Next let me endeavour to point out some reason why menthol is to be held to be *an antineuralgic agent*. As a preliminary, allow me to mention that, in lecturing on the essential oils, Professor Fraser says, "These oils are productive of irritation to mucous membranes; they are contra-tetanic, and diminish reflex excitability; they are antispasmodics and cardiac stimulants, but large doses paralyze the heart's action; they improve digestion, but may cause gastritis; and they are antiseptics and local anæsthetics"; and he explains further that they paralyze the terminations of sensory nerves. Now, I have

reason to believe that these very properties are possessed to a greater or less extent by menthol. That menthol irritates mucous membranes any one can make out by tasting a crystal or two, and this irritation is of the peculiar peppermint kind. Further, it is an interesting fact that after so tasting the crystals or solution there is an intense feeling of cold in the mouth, fauces, and pharynx. Regarding its antispasmodic and cardiac actions, I may tell you that I myself am, so far fortunately, possessed of a heart which occasionally shows rather much excitability of action. Well, I have found that a dose of from $\frac{1}{10}$ to $\frac{1}{6}$ of a grain of menthol steadied the contractions, and afterwards slowed them to a comfortable speed; at the same time I felt slight cerebral drowsiness. Ten or a dozen of the common strong lozenges of peppermint have produced the same effect. That is my own experience so far; but I would not advise the internal administration of menthol unless well diluted or an emetic action from gastric irritation is wished, as half a grain of the crystals has in my own case produced this effect.

Now, all that I contend for as to antineuralgic action in the meantime is, that menthol will temporize until constitutional remedies have time to take effect. In the first two cases I gave nothing, but in the last three I ordered a purge of castor-oil, as seen with good effect. The quinine, or arsenic, or iron, or phosphorus will have to be used; but my hope is that menthol will be found an effective substitute for the applications of aconite, or veratria, or atropia in most cases.

The final case of neuralgia, and my strongest one, which I have to mention, is that of a gentleman who occupies an eminent position amongst the surgeons of Edinburgh, and who, after a personal experience of the effects of menthol in solution of forty-eight grains to the ounce of rectified spirit when suffering severely from neuralgia of the supra-orbital branch of the fifth nerve, pronounces the opinion that that solution, though only temporary in its effects, and requiring frequent renewal, is the best external application of the many he has tried. That opinion, gentlemen, is the strongest testimony I have to offer you on behalf of menthol, and of itself would warrant me in asking a trial for menthol.

Since menthol was of use in neuralgia, I reasoned that it would be applicable also in toothache. Here I will only state that I had the opportunity of trying it about fifty times last autumn, and I gave at the same time some castor-oli. In three of the cases temporary benefit only was obtained; one was connected with the shedding of a milk and appearance of a permanent tooth, another was unexplainable, and a third was the toothache of pregnancy, which I contented myself with think-

ing could only be permanently cured by removal of the constitutional cause. The other cases were immediately relieved. One, I may mention, had been tortured for a week, and had the lips and gums quite blistered and sore, from the application of creosote, mustard, whisky, and other popular remedies.

From neuralgia I easily passed to sciatica, and I have only had the chance of applying menthol in three cases. Permission to do so was very kindly given me by Dr. Affleck at the medical waiting-room so late as October last.

In the first case the patient was scarcely able to walk when he entered. I painted the tract of the sciatic, popliteal, and tibial nerves as far as the ankle-joint with a 1 to 10 solution, and the result was that in three minutes he expressed himself free from pain, and as soon as his dress was adjusted he walked out, "being better able to walk," as the patient himself expressed it, "than he had been for thirteen weeks." But this effect only lasted for a quarter of an hour. On next seeing him, however, the effect remained for an hour and a half, he being in the sitting position all the time. In the other two cases I only made one application of the menthol, but both expressed themselves free from pain after the lapse of fully half an hour, when they went out of the waiting-room.—*Edinburgh Medical Journal, Aug.* 1880, *p.* 121.

86.—ON THE PHYSIOLOGICAL AND THERAPEUTIC ASPECTS OF OPIUM.

By M. Pecholier, Paris.

An essentially complex drug, the properties of opium are neither limited nor uniform, its action cannot be defined by saying opium induces sleep—*in eo virtus dormitiva:* its effects are much more complex. According to Brown, opium is always an excitant; Hufeland ranks it as an excitant of the circulatory system, a sedative of the nervous system; and M. Pécholier, who has just published a work on the action of opium, is of the same opinion. He, however, makes some reservations, and does not believe that opium acts as a sedative on the whole of the functions of the nervous system. He says that its only direct sedative action is that which it produces on sensation. On all the other functions of the nervous system, it acts in the first place as an excitant; this excitant power is as strongly marked over the intellectual activity and muscular contractility, as over the circulation and the respiration. It is true that a depressant action succeeds the original excitement, and that this sedation is so much the stronger according as the excitation has been the more marked; but this is a kind of fatigue; it is not the principal primary and direct effect of the opium.

A small amount of reflection will enable us to understand that opium must necessarily possess varying properties connected with the diverse substances comprised in it. If thebaine, narcotine, and papaverine are essentially endowed with an excito-motor power, morphine, and still more narceine, are essentially sedative—at least, in relation to the functions of the nervous system. "That is why," says M. Pécholier, "if the resultant opium has usually the effects above mentioned, it may exceptionally exercise at once a weakening power over the whole nervous activity, according to idiosyncracies, various pathological conditions, and the composition of the drug itself." This exception is generally found amongst those who take opium for the first time in small doses at long intervals. Use gives its proper effects to every active principle. Claude Bernard, after his remarkable researches on the alkaloids of opium, especially advised the employment of those substances of which the effects might be foreseen and calculated. Practice has not always justified this view. In the same way that digitaline does not take the place of digitalis, so in many cases it is necessary to have recourse to opium; it is a necessity in its absolute integrity, for its principles, incongruous in a physiological point of view, give to each other an important support as therapeutic agents. In toxic, but still moderate doses, opium always produces the same succession of phenomena; but, if massive doses be given, the excitant effects are suppressed, and the opium at once acts as a sedative. The excitement of the intellectual faculties produced by opium is very marked. Here we have a little known effect, and on which M. Pécholier rightly lays stress. Furthermore, in a healthy subject, opium in medium doses does not always induce sleep; insomnia is often noted, and, again, habit renders this insomnia of usual occurrence. Opium increases the cutaneous secretion, at the same time that it diminishes the salivary, intestinal, and urinary secretions. At the same time nutrition becomes less active; there is, according to the graphic expression of the writer, a catalepsy of nutrition.

After this physiological study, M. Pécholier enters on the therapeutic aspect of opium. The indications for its use are well known to be frequent, but the principal indication is when the nervous element is in question, in spasms and pain. The contra-indications for opium are all comprised in the existence of hyperæmia. So long as the pulse is small, soft, and compressible, opium is rarely contra-indicated, but when the pulse becomes full, and especially full and hard, opium is almost always hurtful. M. Pécholier reminds his readers that, opium being an active agent in the prevention of disassimilation, the reason of its utility in diabetes is plain. He ends his mono-

graph by a description of the deplorable effects produced by the use of opium.—*London Medical Record*, *July* 15, 1880, *p.* 262

87.—SOME CLINICAL OBSERVATIONS ON TWO CASES OF HEMOPHILIA.

By Dr. W. H. T. Winter, House Surgeon to the South Staffordshire Hospital.

When the Venetian barber pricked his nose and bled to death, he little thought the disease of which he was the victim would baffle the researches of the physician for over three centuries, and prove one of the greatest enigmas of medicine.

This paper is written as an addition to existing statistics, rather than as an exposition of any fresh view of this awful malady. The two cases related were under the care of Mr. Newnham, and I am indebted to him for allowing me to publish them :—

Case 1.—James S., a boy of twelve years of age, was admitted on 15th November, 1879. He had a fractured femur complicated by an old contraction of the knee-joint on the injured side. There was a considerable effusion of blood at the seat of the injury, and there existed an amount of pallor and shock disproportionate to the nature of the accident. Owing to the shape of the limb, we had to put up the fracture on a well-padded angular splint. In a month the fracture had firmly united without the formation of much callus, and it was thought advisable to try gentle extension. The limb was, in the course of a week, brought from a right angle to an obtuse angle, when a sudden and rapid effusion took place into the knee-joint. It was accompanied by considerable pain, and was coincident with an attack of epistaxis. Extension was discontinued; suppuration took place into the joint; the skin thinned, as over a chronic abscess; an opening was formed by nature, and a large collection of blood-stained pus was let out. Convalescence was more rapid than was anticipated. The boy grew fatter about the face, and regained some colour. The wound into the knee-joint healed, and extension was again employed. By April he had a fairly straight limb.

From time to time the patient had an attack of epistaxis, which yielded temporarily to the perchloride of iron spray. If he cut himself or even received a scratch, he would have a prolonged attack of hemorrhage—the blood coming with a slowness and persistency that I have since learned is characteristic of the disease. Iron, tannic acid, cold, and alum were only of temporary service. Pressure, applied with the greatest caution, caused superficial sloughing, and rest and the elevated position seemed the only means of arresting hemorrhage for any considerable time. Internally drugs were useless, although

small doses of sulphate of iron with sulphate of magnesia each morning seemed to improve his condition, and increase the periods between the hemorrhages. As regards diet he was allowed the most generous food and a small quantity of port wine at his dinner. On 20th May, 1880, the patient was discharged in excellent health, having had no bleeding from the end of January. He had lost his bluish waxy complexion, and looked fat and rosy, and was able to get about on crutches. Five weeks later I heard that the boy was lying ill at home, so I told his relations to bring him to the hospital. He had been well up to 9th June, and had till then suffered from no hemorrhage since he left the hospital. On the 10th, when getting out of bed, the patient noticed there was a swelling of his left thigh—the side opposite the fracture. By mid-day the swelling had increased considerably. There was great pain, and he was compelled to keep to his bed.

On the 24th of June the patient was re-admitted. He was profoundly anæmic. There was great emaciation of the lower extremities, and to a lesser degree of the rest of the body. He looked waxy and flabby. The tongue was white and soft, and the gums anæmic, and his appetite was bad; he had a bitter taste in his mouth; his bowels were not regularly open, and the smallest quantity of solid food made him sick. The left thigh was considerably swollen, and the skin discoloured. The middle third felt hard and brawny, but there was no œdema. There was considerable pain in the part, which prevented the patient going to sleep. After the irritability of the stomach had been allayed by bismuth and soda, the appetite was improved by mineral acids and vegetable bitters. He was kept in bed, and the greatest care taken by the nurse to prevent bed-sores. As his health improved, the blood tumour on his thigh gradually shrank, and the skin over it became shrunken and desquamated. He was placed in the ambulance on sunny days, and wheeled about the grounds, and before he had been here three weeks he was able to get about on a wheeled chair. Latterly Mr. Newnham has ordered hamamelis, but we have had no results which would justify us in giving an opinion of the value of the drug in hemophilia.

I have, so far, not mentioned the history of the patient's family. He is one of nine children—six boys and three girls. The girls are robust and large for their age. They have never suffered from any illnesses except those of infancy. The youngest boy, a baby in arms, has not had any manifestation of hemophilia. The other five were healthy till they were about six years of age. They then bled after the slightest injuries, the hemorrhages being stopped only by nature—any attempt at pressure being followed by blood blisters and sloughing. Four

or five times a year they have had an attack of epistaxis, when a knee or an elbow becomes painful and swollen and they have to lie up for a time in bed. The eldest brother (aged eighteen) has recently had pain and swelling of the wrists. The doctors tell them that they suffer from "rheumatism."

Mrs. S., the boy's mother, is a spare and florid woman. She has no tendency to bleed, and enjoys good health. She had no sisters, but she had two brothers; one died at two years of age from cholera; the other from about six or seven years of age had hemophilia, and died from an injury to the shoulder at the age of twenty-three. Suppuration took place in the injured part; the abscess was opened; he bled obstinately, and died in a week or two. The mother of Mrs. S. was healthy, and so were her maternal aunts. She had a maternal uncle who was the subject of the hemorrhagic diathesis; he died before he arrived at the marital age. There is no history of tubercle, gout, or syphilis.

On the patient's father's side there is a tendency to rheumatism. His father's family died comparatively early, while if his mother's relations live beyond twenty-five they attain an advanced age.

Case 2.—Henry A., a strong, well-built young man of twenty-one. On the 2nd July, 1880, he crushed his great toe in a threshing machine, and in Mr. Newnham's absence I amputated. I had no notion that he was the victim of this terrible diathesis. After the operation the little bleeding there was was arrested by cold, and the wound dressed after Guerin's method. The temperature that night was 99°, and no anxiety was felt about the result.

On 3rd July, on visiting the patient in the morning, I was struck with the forcible pulsation of the carotids. The pulse was 140, full and compressible; the temperature 100°; and the foot looked inflamed. A purge was ordered. At mid-day the patient was again seen, and, as his condition had not improved, the dressing was removed. There was a clot in the wound, and there was a tendency to bleed, but the hemorrhage was so slight that it seemed hardly to demand special attention. The evening temperature was 100·6°.

On the 4th the temperature was 102·8°, and the superficial vessels were seen to pulsate with painful distinctness, and there was a bruit in the veins of the neck. The pulse was 150. The dressings, on being removed, were somewhat soiled. The wound was laid open and the clots turned out, but there was no bleeding vessel to be discovered. The whole wound oozed with a scarcely perceptible slowness. After wiping it, it first looked sticky, then moist. In a moment or two a drop formed, grew larger, and rolled off the wound. I then found out that the

patient was subject to the hemorrhagic diathesis. He told me that some months previously he had been kicked in the face by a horse, and that there was obstinate bleeding from the wound. He had, at intervals, had attacks of epistaxis. He had a brother who had been a bleeder till he was eighteen, but after that age he had not suffered from profuse hemorrhages after injury. Another brother, too, had a tendency to epistaxis. The limb was raised and cold applied, but the bleeding was not stopped. It oozed drop by drop. Then powdered alum was tried, and afterwards tannic acid, but with no permanent success. The evening temperature was 103·8°, and evening pulse 140. The carotids pulsated violently. The patient was put on a mixture of tr. digitalis ℥ 5 and tr. ferri perchloridi ℥ 30 every four hours, and a hypodermic injection of morphia was administered.

5th July. Morning temperature, 101°; hemorrhage stopped by tr. ferri perchlor. applied locally; evening temperature, 100°.

6th. Bleeding from wound from 3 to 5 a.m.; morning temperature, 101°; evening temperature, 103°.

7th. Morning temperature, 103·6°; evening temperature, 102·2°. Tenderness along the left external saphena vein.

8th. Morning temperature, 102°; evening temperature, 103·8°; pulse, 116. Pain along left saphena; sloughing of wound. Patient was put on quinine and iron.

9th. Morning and evening temperature, 103°; morning pulse, 170. Tr. aconiti ℥ j. every hour. Evening pulse, 150.

10th. Morning temperature, 102°; evening temperature, 103°.

11th. Morning temperature, 101°; evening temperature, 102·8°.

12th. Morning temperature, 100°; evening temperature, 101·4°. The slough separated.

13th. Morning temperature, 100·8°; evening temperature, 104°.

14th. Morning temperature, 100°; evening temperature, 102·8°. The wound was covered with œdematous granulations. The pulse was 140, dicrotous. R. Tr. digitalis, ℥ v.; tr. aconiti, ℥ ij.; ammon. carb., gr. 3; sextis horis.

15th. Morning temperature, 100°; evening temperature, 102·8°. The pulse had steadied. It was noticed that there was a subcutaneous collection of pus along the inner side of the right leg.

16th. Morning temperature, 100°; evening temperature, 102·4°.

17th. Morning temperature, 100°; evening temperature, 105°. The collection of pus was let out by a puncture, and a fine drainage tube introduced.

18th. Morning temperature, 103°; evening temperature, 105°. A collection of pus formed over the lumbar vertebræ.

19th. Morning temperature, 103·5°; evening temperature, 105°. Potassa fusa was applied over the back, and an eschar as big as a shilling was made.

20th. At 2 a.m. the patient vomited some yellowish, inodorous, pultaceous matter. At 6 he had a rigor, and his temperature was 103°. At 8 his temperature was 99°, his breathing was distressed, and it was found that an effusion of pus had taken place into the knee-joint. His complexion was yellow and waxy. He seemed improved at mid-day. He slept for some hours after dinner, and on awaking tried to speak but was unable. In a few moments he was dead.

A *post-mortem* was made forty-eight hours after death by Dr. Mortimer. Rigor mortis was present, and there was some hypostasis. The right knee contained some thin sero-pus. The wound of the toe was covered with flabby granulations, and no pellicle had formed at the edges. The abscess cavity on the side of the right leg had shrunk up. There was an eschar on the back, which had begun to separate from the healthy tissues. In this situation there was some pus. Old adhesions were found on the surface of the right lung. Both lungs were healthy. The pericardium contained a slight excess of blood-stained fluid. The heart was pale and hypertrophied. There were large and firm fibrinous clots on the left side. The foramen ovale was closed. All the viscera, with the exception of the spleen, were pale. The spleen was gelatinous in appearance and pulpy to the feel; it weighed 12 oz.

These two cases have been related from notes taken at the time. Since then I have read Prof. Immerman's exhaustive article on "Hemophilia." I have not thought fit, however, to alter anything I have already stated, as observation, unfettered by a knowledge of the literature of the subject, has a definite value, provided the basis of observation is not ignorance.

I have drawn the following conclusions from Immerman's paper, and have supplemented them by my own experience:—

Hemophilia may be defined as a tendency to persistent idiopathic and traumatic hemorrhages. The diathesis is generally hereditary, and in the vast majority of cases is transmitted through the mother. Parents connected with bleeding families are generally prolific; they have nine or ten children, as compared with the average of ordinary marriages, which is five. Male hemophilists rarely procreate, as they generally die before the marital age; but when they live and marry healthy women, they usually do not transmit the diathesis. In children of the same families the disease occurs 4·7 times more frequently in the sons than in the daughters. The diathesis generally lasts throughout life.

The Anglo-German and Jewish races are more liable to the diathesis than other races.

The first appearance of the disease is generally in early childhood. In the S. family it first showed itself in five individuals between the ages of five and six; and in the A. family in two

boys somewhat earlier. The third son has occasionally excessive bleedings, but can hardly be classed as a hemophilist.

Disposition to bleed, says Grandidier, is specially marked at the second dentition, at puberty, and—in females—at the first appearance and at the cessation of the menses.

Any traumatic lesion in a bleeder may excite a characteristic bleeding. The danger from the same kind of wound is not equally great at all times; it may be greater at certain critical periods of the patient's life and at the changes of the seasons.

A traumatic hemorrhage aggravates temporarily the manifestations of an already developed diathesis. I have seen many instances of this in James S. For instance, Jan. 19th, 20th, 21st and 22nd, hemorrhage from cut of thumb; Jan. 23rd, epistaxis; 24th, hemorrhage into knee; 25th, epistaxis.

In the table of 308 cases, drawn from Grandidier's statistics, hemorrhage from the nose occurred 152, from the gums 38, and from the intestines 35 times; hemoptysis 17; hematuria 16; and hematemesis 14 times. The rest of the hemorrhages took place from the genitals, tongue, ear, &c.

The hemorrhage in these cases is capillary. Its danger is more due to its duration than to its profuseness. Bleeders bear great losses of blood well, and the loss is soon repaired.

The blood, it seems, contains an unusually large quantity of fibrin and red blood-cells, and therefore the habitual condition is rather that of plethora than that of anæmia.

The superficial vessels are more numerous than natural. The superficial arteries are abnormally wide, while the aorta, pulmonary artery, and their branches are abnormally narrow. There is an excessive thinness of the coats of the arteries, and the inner coat has been found undergoing fatty degenerations, as in anæmia and chlorosis.

The heart is often hypertrophied. When this condition exists it affects the left ventricle more often than the whole organ.

The most frequent complications of hemophilia are neuralgia, rheumatism, and joint affections.

For further information on the disease I would refer the reader to Vol. xvii. of Ziemssen's "Encyclopædia," and to Dr. Wickham Legg's "Treatise on Hemophilia."

In many recorded cases operative interference has terminated fatally in bleeders. Circumcision and division of the frenum linguæ have caused death, and the opening of abscesses has had disastrous results. Dr. Hunt has related to me the case of a gentleman who underwent lithotomy, and who was the subject of the hemorrhagic diathesis. He died a short time after the operation.

In nearly all these cases there was no pre-knowledge of the

existence of the diathesis; and, after my own experience, I would earnestly entreat the profession to make some inquiries with regard to hemophilia before using the knife.

In both the patients whose cases I have related all the hemorrhages were of the same type; and so much have I been impressed by it that I am led to believe that the method of bleeding which I have described is pathognomonic of the disease.

To one other point I would call the attention of the profession. Are not the high temperatures which follow attacks of hemorrhage due to septic poisoning? As far as I have seen, interstitial hemorrhages are not followed by such high temperatures as bleeding on free surfaces, and the temperature does not rise till time has been allowed for the products of hemorrhage to putrefy.—*Dublin Jour. of Med. Science, Sept.* 1880, *p.* 202.

88.—ON THE USE OF NITRO-GLYCERINE IN MIGRAINE, ASTHMA, AND ANGINA PECTORIS.

By A. W. Mayo Robson, Esq., F.R.C.S., Leeds.

The following brief record of cases in which I have used nitro-glycerine may, I venture to hope, prove interesting, especially as an account of the physiological action of the drug was recently given in the British Medical Journal. During the last twelve months, I have tried the remedy in migraine, asthma, angina pectoris, and epilepsy.

In migraine, one or two drops of a one-per-cent. solution produces, within a few minutes, a diminution of tension in the previously corded temporal artery and relief of the pain, which in some cases does not return, but in others recurs when the physiological effects of the drug have passed off. As individuals are affected differently by nitro-glycerine, I always begin with one minim of the one-per-cent. solution, but sometimes find it necessary to increase the dose to three or four minims, to produce the desired effect. In several cases of asthma, it has relieved the breathing in a most remarkable manner: the cases in which it answers are such as would be relieved by amyl-nitrite, but its effects are more marked and the relief is more durable.

One case of severe asthma, occurring in a patient suffering from chronic renal mischief and mitral deficiency, is worth specially mentioning. I prescribed the one per cent. solution in the form of a minim to a drachm of water, and ordered two drachms to be taken every quarter of an hour till relief was obtained. My patient, however, had two large tablespoonfuls of the medicine given, instead of two teaspoonfuls. He said that the effect was wonderful; he thought his head was going to burst, but his breathing was effectually and permanently relieved, and that instantly. In this case, amyl-nitrite, al-

though inhaled in large doses on previous occasions, had given very little relief. Since that time, several months ago, he has been threatened over and over again with his old attacks, but a dose of the medicine always staves it off.

In angina pectoris, the relief given by nitro-glycerine is most complete; but, as several cases have been reported in the journals, I need only mention it. The relief in these cases is not simply temporary ease from pain, but, if the remedy be given thrice daily in gradually increasing doses, beginning with one minim of the one-per-cent. solution and steadily advancing to eight minims, the attacks lessen both in frequency and intensity. One of my patients, who has suffered severely from angina, always carries a bottle of the medicine in his pocket, and he tells me that, by taking a dose of five drops, when he is threatened with an attack, it is always prevented.

I am trying it in some cases of epilepsy; but as yet my observations are not sufficiently advanced to be worth relating. I cannot see why, if it relieve the vaso-motor spasm in other diseases, it should not also have the same tendency in this most distressing disease; and, since its regular use in angina seems to be curative, I have hopes that here we may have a similar effect. Again, if the "aura" gave sufficient warning, it might be worth while to try if a good dose would prevent an attack.

I have not had a chance of trying it in sea-sickness, but should think it might do good; and it would certainly have this advantage over amyl-nitrite, that all the other occupants of the cabin would not be compelled to inhale its fumes for some time afterwards, which is the case if amyl-nitrite be used in the ordinary way, much to the annoyance of those who are well.—*British Medical Journal, April* 10, 1880, *p.* 556.

89.—ON CITRATE OF CAFFEIN AS A DIURETIC.

By Dr. D. J. Leech, Physician to the Manchester Infirmary.

In some cases of abdominal dropsy of obscure origin, but probably dependent on chronic peritoneal changes I have had evidence of the diuretic effect of caffein.

In one case two-grain doses of the drug caused headache after it had been given three times daily during a week. It is impossible to say that no diuretic effect followed. Yet the increase in urinary excretion, if any, could not have been great. When caffein was ordered in three-grain doses every three hours, the urine increased greatly in quantity, but the headache, sickness, and palpitation followed the exhibition of the drug in these doses so quickly that the full quantity could not be given, and hence the variation in the daily amount administered.

A cessation of the caffein for a few hours always caused the troublesome symptoms to disappear. Another attempt to administer the drug on the 21st and 22nd of April was followed by similar results, sickness, headache, and palpitation following when two or three doses had been given. Save for the temporary troubles caused by caffein, the girl had steadily improved in health after the second tapping. No increase of fluid in the abdominal cavity had taken place for some days when she was suddenly seized with an attack of convulsions whilst walking in the Infirmary grounds. She died a few hours afterwards in a second attack. At the post-mortem the kidneys were found somewhat congested, but otherwise healthy.

My experience of the action of caffein leads me to believe that in many cases of œdema and ascites from various causes it will set up a diuresis when potent drugs of its class have quite failed to act upon the kidneys, though at times of course it will fail where other diuretics succeed; but it has certain properties which limit its utility.

The diuretic effects of caffein seem to depend in part on the influence which it exercises on the general circulation, in part on a specific action which it has on the kidneys. Unlike digitalis, it has little, if any, influence on the vagus, but it resembles digitalis in directly stimulating the heart and increasing the blood pressure. It probably augments the vascular tension too, by causing contraction of the small arteries. But the action of caffein in increasing the blood pressure depends on the dose in which it is given, and hence varying opinions have been held as to its effects on the blood pressure. Most observers have come to the same conclusion as Dr. Hughes Bennett, that caffein increases the frequency of the heart's beat and its force; but in 1872 Aubert recorded in Pflüger's Archiv some experiments which led him to believe that caffein does not increase, but decreases, blood pressure. He injected the drug into the jugular veins of many animals, and always found the blood pressure sink. Bintz has, however, again carefully investigated the effects of caffein on the circulation, and published his results in the Archiv für experimentele Pathologie und Pharmakologie for June 1878. He finds that moderate doses, when injected subcutaneously, always increase the blood pressure, as well as the frequency of the pulse, and points out that Aubert's opposite results were due to the large doses of caffein which he employed, and to the injection of the drug into the jugular vein, whereby its full influence was at once expended on the heart.

A large dose of caffein may lessen blood pressure, and thus tend to reduce rather than increase the urine flow. I think I have met with one or two instances in which from this cause

the good results anticipated from caffein have failed to appear. Too small a dose equally fails in promoting diuresis, since it does not stimulate sufficiently the circulation.

Caffein, then, may fail either from the smallness or the largeness of the dose.

The condition of the heart-walls, the extent to which they are weakened by advancing disease, bears of course in an important manner on the results obtained from caffein. Time after time in cardiac dropsy the heart and kidneys may answer to the whip, and the patient be restored to comparative health; but especially under unfavourable circumstances deterioration of the tissues goes on and at length the whip fails. In my first case, pericarditis with effusion, which appeared during the sixth week of the man's stay in hospital, may, by its effect on the tissues, have tended to prevent the favourable result which appeared on the administration of the caffein at first. Often, however, no special cause can be found for the advancing changes which are only in accordance with the natural history of the disease.

Caffein not only acts, like digitalis, as a vascular diuretic, but also specially stimulates the kidneys. The nature of this special action is of course obscure. Gubler compares it to the action of certain drugs on the salivary glands, whereby the flow of saliva is greatly increased. We may suppose that these drugs act on the salivary glands just as stimulation of the peripheral end of the divided chorda tympani nerve acts on the submaxillary gland, that is, by increasing the vascularity of the gland through the special vaso-motor centre presiding over the local circulation, the activity of the secreting tissue being increased at the same time, though, to a certain extent, independently. If caffein act in a similar manner on the kidneys, the causes of its frequent success and occasional failure become clearer. A failing general circulation, which cannot be sufficiently stimulated, may prevent that vascular excitation of the organ which is essential to increased secretion; and tissue changes in the kidney itself, or circumstances which affect the innervation of the kidney, may likewise prevent the special local effect of the drug being exercised. The tissue changes, for example, in chronic Bright's disease may usually render impossible the local action which leads to diuresis, though at times the structure of the kidney may be less interfered with, and the drug may excite its wonted local effect and diuretic influence. In my hands, citrate of caffein has failed to induce diuresis in chronic Bright's disease, but Professor Botkin of St. Petersburg records in Virchow's Archiv an instance of its successful administration. The chronic congestion sequential to the heart disease certainly does not seem to prevent the action of caffein.

My experience of caffein in ascites from liver cirrhosis and chronic peritonitis is too small to enable me to say that it usually fails in the one, and is useful in the other, but should a real difference be found to exist between its efficacy in the two classes of cases, the connection between the innervation of the kidney and that of the liver might explain it.

The success of caffein as a diuretic is interfered with by two other causes. One is the readiness with which the system gets accustomed to caffein, which then, like opium, ceases to have its accustomed effects; the other is the variability of the action of caffein on different organs dependent on individual peculiarities.

To the readiness with which our organs get accustomed to caffein, we probably owe our immunity from troubles which might otherwise follow our large consumption of the infusion of the roasted bean. In most cases tolerance is established in both man and animals very quickly. Bintz found in his experiments on dogs with caffein that he could not use the same animals many times, because they so soon became habituated to the drug, which then ceased to produce its characteristic results.

It seems quite possible that some instances of the failure of caffein as a diuretic may be due to the tolerance of caffein which long and abundant potations of the infusion have brought about; and the instances of the subsequent failure of caffein after it had acted at first well may, at least in part, be attributed to the tolerance established.

Most drugs are found to act differently in different individuals, but caffein is specially variable in its effects. In the majority of people, it acts on the circulation generally, and in very many causes headache. Sometimes it causes sickness, sometimes diarrhœa. Not unfrequently diuresis follows its ingestion, rarely salivation; and it may produce any of these effects singly, or several at the same time. At times, too, it seems to affect no organ—at least in ordinary doses. It will be remembered that coffee infusion resembles caffein in this variability of its action. Most feel no result from it, but a cup of coffee will in some cause sleeplessness, in others diarrhœa, whilst diuresis is not an uncommon result, and even salivation has been produced by free coffee drinking, as in a case mentioned by Fonssigrives.

The advantages of caffein as a diuretic are as follows. It can be readily administered in pill, or mixture, or in a cup of coffee. It is a tonic and stimulant diuretic, not depressant. It acts quickly; if not effectual in the first twenty-four hours, it rarely acts at all, unless the dose be increased. It may be given safely. When the limits of the full dose have been reached, warning

in the shape of headache or sickness is usually given, and these symptoms pass off at once on withholding the drug.

On the other hand, its administration presents a few disadvantages. It sometimes readily causes sickness and headache, which may, if the dose given be large, produce considerable discomfort. I have known troublesome palpitation induced when large doses have been persevered with; rarely palpitation is brought on by doses too small to cause diuresis. Its effects are less continuous than that of some other drugs: often the effect on the kidneys ceases the day after the caffein is stopped; seldom does it last more than a couple of days.

Caffein will at times cause diuresis and amendment where digitalis fails. Some of the cases mentioned by Dr. Shapter and the first two on my list illustrate this. But digitalis is sometimes the more powerful agent for good, especially when the circulation is extremely weak and the anasarca is not excessive. It may be that digitalis is the more powerful cardiac stimulant. Certainly its effect on the vagus should make it more influential as a regulator of the heart, though caffein does not seem wanting in some power in this respect.—*Practitioner*, *July* 1880, *p.* 25.

90.—NEW PORTE-VACCINE CASE.

A New Porte-Vaccine has been designed by Messrs. Salt and and Son, Surgical Instrument Manufacturers, Birmingham, at the suggestion of Dr. Patterson, Oldham.

This little case is designed as a convenience for Public Vaccinators and others, requiring to store Lymph, and to distinguish the sources from which it is derived. It is composed of light metal, elegantly chased, and contains three separate compartments, each capable of holding six capillary tubes. On the upper side of the case are inlaid three narrow slips of ivory, on which the name of the child (or a number referring thereunto) from whom the lymph has been taken may be recorded, and washed off when it is exhausted. Should two compartments be considered sufficient for this purpose, the centre one may be occupied by a lancet, a neat and suitable one being provided.

The case is very light, elegant and portable, and will be found useful; the wood-cut is drawn on a scale of two-thirds.

91.—SALT & SON'S NEW URINARY TEST CASE.

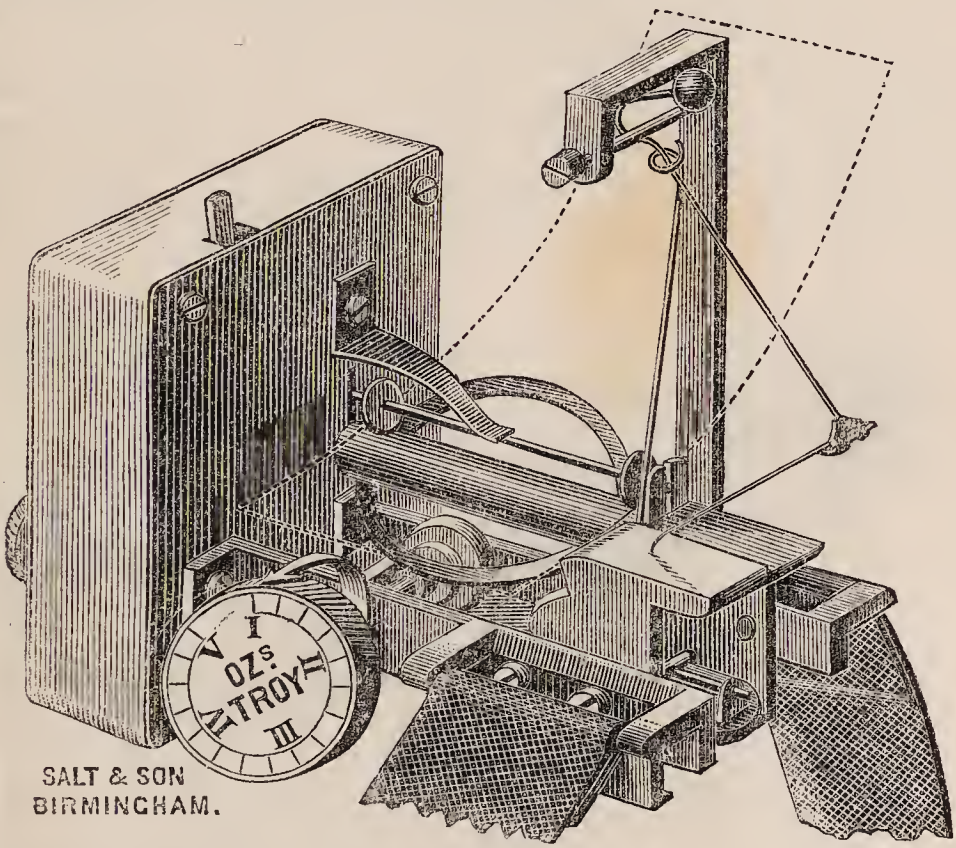
A very compact and convenient urinary test case has been designed by Messrs. Salt and Son, of Birmingham. It is made of metal divided into compartments, and contains the following apparatus and tests (*i.e.*) Spirit-lamp,—Thermometer,—Urinometer,—Trial glass,—Test tubes,—Litmus and tumeric paper,—Vulcanite bottle for acetic acid,—and three small metal boxes for holding respectively, Cupric tests, Nitric acid, and Caustic potash, the first being in the form of pellets as recommended by Dr. Pavy, and the two latter contained in thin glass beads hermetically sealed, specially prepared at Messrs. Salt & Son's suggestion; these beads are easily crushed by means of a pair of fine forceps designed for the purpose, and contained in the case.

The reagents are thus perfectly protected from decomposition, and from injuring the contents of the case. The size of the case is $4\frac{3}{4} \times 2\frac{3}{4} \times 1\frac{1}{4}$ inches, whence it will be seen that while the apparatus is sufficiently large for all practical purposes, it is presented in a form so portable as to be of little inconvenience in transport.

In addition to the above, a larger case is made in leather, which contains, besides the instruments enumerated, a small Microscope, especially designed by Messrs. Salt & Son, having a $\frac{1}{4}$ in. objective, and capable of detecting organic changes in the condition of the urine. This exceedingly useful adjunct is illustrated and described in the current number of the *Retrospect*, p. 352.

92.—DR. DUDGEON'S POCKET SPHYGMOGRAPH.

Messrs. Salt & Son of Birmingham have introduced to the notice of the medical profession, Dr. Dudgeon's Pocket Sphygmograph, which has been made for him by Mr. Ganter. The illustration is full size of the Instrument.



The advantages of this Instrument are:—

1. It magnifies the movements of the artery in a uniform degree, viz. 50 times.

2. The pressure of the spring can be regulated from 1 to 5 ounces.

3. It requires no wrist-rest, and may be used with equal facility whether the patient is standing, sitting, or lying.

4. With it a tracing of the pulse can be made almost as quickly as the pulse can be felt with the finger.

5. Its sensitiveness is so great that it records the slightest deviation in form or character of every beat.

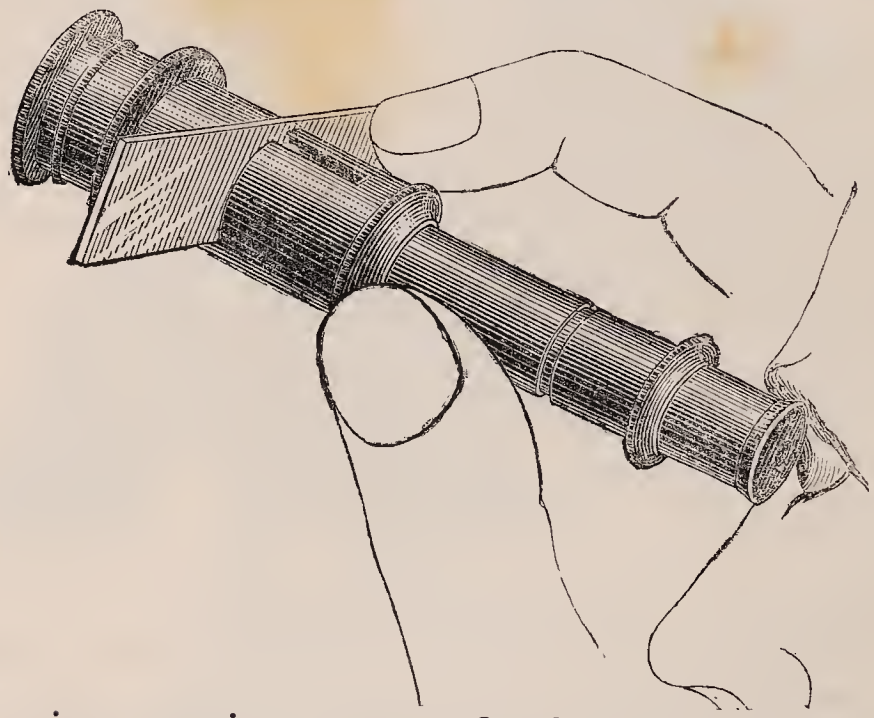
6. Its construction is so simple that if accidentally broken any watchmaker can repair it.

7. It is so small ($2\frac{1}{2}$ by 2 inches) and it is so light (4 oz.) that it can easily be carried in the pocket.

8. It is only one-third of the price of the cumbrous instruments hitherto offered to the profession.

93.—"REGISTERED" URINARY MICROSCOPE.

This very handy little instrument has been designed and "registered" by Salt & Son, Surgical Instrument Makers, Birmingham, to facilitate the prompt and ready microscopic examination of urine for the detection of blood corpuscles, pus, &c. The peculiarity of this instrument is that it enables the troublesome adjuncts hitherto deemed essential in all compound microscopes for illuminating the field to be dispensed with, sufficient light being obtained by simply presenting the tube when applied to the observer's eye to a window or lamp, when the rays of light are intensified by a small condensing lens, so as to render any object in focus distinctly visible.



The microscope is a compound achromatic one, furnished with a quarter-inch objective, having a magnifying power of 120 diameters, and a sliding tube of short range for adjusting the focus. The mode of using the instrument is exceedingly simple. A few drops of the suspected urine are placed between two small glass slides, where the fluid is retained by capillary attraction; the slides are then placed in a deep notch in the lower part of the microscope and held *in situ* by a sliding tube with milled flanges; the microscope is then applied to the eye as shown by the engraving, and the focus adjusted, when the corpuscles or pus, should there be any, are at once apparent. The small bulk and moderate price of the instrument, combined with its efficiency, and the facility with which it can be used, will render it acceptable to the profession. Messrs. Salt & Son are indebted to Mr. Parkes of Birmingham for the great care he has taken in carrying out their wishes. The woodcut is drawn to a scale of two-thirds actual size.

INDEX TO VOL. LXXXII.

PAGE.

Acetate of alumina as an antiseptic, Ed. of Medical Times and Gazette on 329
Acidity of the stomach, Drs. Ringer and Murrell on glycerine in... ... 90
Actual cautery in nævus, Mr. Walker on the use of the 240
———— in ovariotomy, Dr. Knowsley Thornton on 296
Acute rheumatism, Ed. of Med. Times and Gazette on the salicylates in ... 44
———— Dr. Young on the use of the salicylates in 45
Air or water pads for splints, Dr. Thompson on 133
Alkaline urine, Dr. Ralfe on a form of dyspepsia associated with 87
Amblyopia, central, Dr. Berry on 218
Ametrometer, Mr. Carter on Dr. Thomson's new instrument 208
Anæsthetic, Dr. Marion Sims on bromide of ethyl, or hydrobromic ether . . 324
———— Dr. Turnbull on hydrobromic ether in labour lxxi
———— Mr. Clover on the administration of ethidene dichloride ... 319
———— Mr. Macleve on a new combination anæsthetic lxxvii
———— Mr. Osborne on Clover's inhaler 317
———— Mr. Osborne on the administration of at St. Thomas's Hospital 314
———— Mr. Osborne on the administration of in eye operations ... 317
———— Mr. Osborne on the treatment of threatening asphyxia from... 318
———— Mr. Osborne on the treatment of threatening syncope from ... 318
———— Mr. Wills Richardson's india-rubber inhaler for ether ... 327
Angina pectoris, Mr. Robson on nitro-glycerine in 345
Ankle-joint, sprained, Mr. Dacre Fox on the treatment of 135
Anti-neuralgic remedy, Mr. Macdonald on menthol as an 335
Antipyretic action of iodine and carbolic acid, Dr. Rothe on the intense ... 9
————treatment of typhoid fever, Dr. Cayley on the 1
Antiseptic agent, Mr. Macdonald on menthol as an 332
———— dressings, Mr. Lawson Tait on absorbent cotton-wool and gauze xliii
———— dressings, Lister's, short directions for li
———— excision of the knee-joint, Mr. Coppinger on 107
———— surgery, Editor of Med. Times on acetate of aluminina in ... 329
———— treatment, Ed. of British Medical Journal on surgical statistics... 137
———— treatment, Dr. Beatson on carbolised catgut ligatures 140
———— treatment, Dr. Beatson on carbolised catgut sutures 155
Arsenic in psoriasis, Dr. Farquharson on the use of 242
————in skin diseases, Dr. Farquharson on 240
Artificially-digested (peptonised) food, Dr. Roberts on 82
Aspiration of joints, Editor of Lancet on 121
Asthma, Dr. Berkart on the treatment of 61
———— severe, Mr. Robson on nitro-glycerine in 344

Bacilli, Dr. Buchner's researches respecting 25
Bacillus anthracis, Prof. Lister on the 19
Bacteria, Dr. Koch's investigations respecting 19
Bacterium of fowl-cholera, M. M. Toussaint and Pasteur's investigations on 21
Bader, Mr. C., his treatment of gonorrhœal ophthalmia 230
Bath treatment of fever, Dr. Reiss on a constant xvii

PAGE.
Beatson, Dr. G., on carbolised catgut ligatures 140
——— Dr. G., on carbolised catgut sutures 155
Bell, Dr. J. H., on wool-sorter's disease 52
Belladonna, Dr. Pearse on its use in nictitation lxix
Benham, Mr. R. F., on the treatment of hemorrhoids by crushing... ... 166
Berkhart, Dr. J. B., on the treatment of asthma 61
Berry, Dr. G. W. on central amblyopia 218
Bigelow's operation for stone, Mr. Teevan on 173
Bodenhamer, Dr., on tying hemorrhoidal tumours 167
Boracic acid in eye diseases, Dr. Theobald on lxviii
Braithwaite, Dr. J. on the treatment of sub-involution of the uterus ... 270
Bright's disease, Dr. Gairdner on the treatment of 99
Bromide of ethyl as an anæsthetic, Dr. Marion Sims on 324
Bronchitis, Dr. Monro on inhalation of carbolic acid in 59
Brown, Mr. F. M., on treatment of compound fracture with tinct. benzoin co. 117
Buchanan, Dr. G., on the radical cure of congenital inguinal hernia ... 156

Cancer Prof. Clay on its treatment by Chian turpentine 27
——— of the breast, Dr. Gill on Chian turpentine in 34
——— of the breast, Dr. Gross on the diagnosis of 301
——— of the uterus, Mr. Kenyon on Chian turpentine in 34
——— of the womb, Dr. Drury on 35
Carbolic acid, Dr. Hall's cases of lupus treated by application of 262
———————Dr. Munro on inhalation of in respiratory affections ... 57
Carbolised catgut, Dr. Beatson on influence of tissues on in aseptic cases ... 146
———————— Dr. Beatson on influence of tissues on in septic cases ... 147
———————— Dr. Beatson on points of surgical importance connected with 149
———————— ligature holders 144
———————— ligatures, Dr. Beatson on application of 144
———————— ligatures, Dr. Beatson on the preparation of 141
———————— sutures, Dr. Beatson on 155
———————— silk sutures, Dr. Beatson on 152
Cardiac sedative, Editor of Lancet on erythrophleine as a 55
Carter, Dr. R. B., on Dr. Thompson's ametrometer 208
Casein, Dr. Roberts on its conversion into peptone 83
Cataract, Prof. Wharton Jones on the operation by discission from behind 209
———— operations, Dr. Story on the methods employed in lxvii
Catarrh of the bladder and acute cystitis, Deecke on lactic acid in ... xxxiv
Catgut for ligation of arteries in their continuity, Dr. Bæchel on xlviii
Cayley, Dr. W., on the antipyretic treatment of typhoid fever 1
Central amblyopia, Dr. Berry on 218
Cervical curette, Dr. Alex. Duke's new 308
Chian turpentine, Prof. Clay on, and its use in cancer 27
———————— in cancer of the breast, Dr. Gill on 34
———————— in cancer of the uterus, Mr. Kenyon on 34
———————— in cancer of the womb, Dr. Drury on 35
Children, Dr. Smith on the treatment of convulsions in 311
Chloral injections in gonorrhœa, Dr. Pasqua on lxiv
Chloride of calcium in phthisis, Dr. Neale on xxvi
Chloroform, Mr. Osborne on the administration of as an anæsthetic ... 314
Chronic bronchitis, Dr. Monro on inhalation of carbolic acid in 59
Citrate of caffein as a diuretic, Dr. Leech on 345
Clamp for crushing hemorrhoids, Mr. Pollock on a new 162
——— in ovariotomy, Mr. Knowsley Thornton on the 294
Clay, Prof. J., on Chian turpentine and its use in cancer 27
Cleft palate, Dr. Woakes's instrument for inserting stitches in operations for 170
Clover, Mr. J. T., on ethidene dichloride as an anæsthetic 319
Coagula, puerperal, Dr. Matthews Duncan on intra-uterine 272
Coats, Dr. J., on twisting of the intestine as a cause of obstruction ... 95
Cold water treatment of typhoid fever, Dr. Cayley on the 5
Collodion in relaxation of the membrana tympani, Dr. M'Keown on ... 237
——— vesicating, Dr. Hisch on the preparation of lxxx

PAGE.

Colo-puncture in intestinal obstruction of nine months' duration, Dr. M'Gown's case 92
Complete intra-peritoneal ligature of ovarian pedicle, Mr. Thornton on ... 297
Compound fracture, Dr. Brown on its treatment by tinct. benzoin co. ... 117
Congenital inguinal hernia in a child, Dr. Buchanan's radical operation for 157
Conjunctivitis, purulent, Dr. Wolfe on the treatment of 229
Convulsions in children, Dr. Smith on the treatment of 311
Copper test capsules for sugar, Dr. Ralfe on the use of xxxv
Coppinger, Mr. C., on antiseptic excision of the knee-joint 107
Corneal ulcers, Dr. Gunn on the treatment of lxviii
Corns, M. Gezow's remedy for lvii
Cottle, Dr. W., on the treatment of ringworm 245
Cough, Dr. Cheesman on oxalate of cerium in xxii
Croton oil and salicylic acid in the treatment of ringworm, Dr. Cottle on ... 245
Crushing, Mr. Pollock's treatment of hemorrhoids by 160
Curette, cervical, Dr. Alex. Duke's new 308
Cus as a tænicide in tapeworm xxxiii
Cystitis, chronic, Dr. Newman on antiseptic injections in xxxiv

Diabetes mellitus, Dr. Hunt on the use of ergot in 103
Digestion of fats, Dr. Roberts on the emulsive ferment 78
Digestive ferments, Dr. Roberts on 76
Discission from behind for cataract, Prof. Wharton Jones on 209
Disease, Prof. Lister on the relation of micro-organisms to 18
Displacement and descent of the womb, Dr. Duncan on lxxi
——— and descent of the womb, Dr. Thornton on lxxi
Diuretic remedies, Dr. Gairdner on the use of in Bright's disease... ... 99
——— Dr. Leech on citrate of caffein as a 345
Double extension in pelvic joint diseases and injuries, Prof. Wood on ... 112
Drainage tubes for antiseptic operations, Mr. Coppinger's india-rubber ... 111
Drury, Dr. R., on Chian turpentine in cancer of the womb 35
Drysdale, Dr., on pyrexin or pyrogen 10
Duggan, Mr. J., on pyæmia, or non-specific blood poisoning 36
Duke, Dr. A., his new cervical curette 308
Duncan, Dr. J. M., on intra-uterine puerperal coagula 272
———————on puerperal fever 277
———————on the treatment of menorrhagia 292
Dyspepsia associated with alkaline urine, Dr. Ralfe on 87
Dyspnœa from meteorismus, in asthma, Dr. Berkhart on the treatment of... 74

Ecraseur, galvanic, Dr. Gould on its use for radical cure of variocele ... 204
Eczema, erythematous, Dr. Bulkeley on Startin's mixture in lvii
Editor of British Medical Journal on surgical statistics 137
Editor of Lancet on the aspiration of joints 121
———————— on the new cardiac sedative—erythrophleine 55
Editor of Medical Times and Gazette on acetate of alumina, as an antiseptic 329
———————————————— on the salicylates in acute rheumatism 44
Empyæma with fetid expectoration, inhalation of carbolic vapour in ... 60
Emulsive ferment and the digestion of fats, Dr. Roberts on 78
Encysted tumors in conspicuous positions, Dr. Foster's method of removing lvii
Ergot, Dr. Hunt on its use in diabetes mellitus 103
——— Dr. Matthews Duncan on its use in menorrhagia 292
Erysipelas, Mr. Leniham on the local treatment of lvii
Erythema multiforme, Dr. Bulkeley on Startin's mixture in lvii
Erythematous eczema, Dr. Bulkeley on Startin's mixture in lvii
Erythrophleine, a new cardiac sedative, Editor of Lancet on 55
Ether, Mr. Osborne on the administration of as an anæsthetic 314
——— inhaler, Mr. Wills Richardson's india-rubber 327
Ethidene dichloride as an anæsthetic, Mr. Clover on 319
Ethylen-dichloride and nitrous oxide gas as an anæsthetic, Mr. Macleve on lxxvii
Excision of the knee-joint, antiseptically, Mr. Coppinger on 107
——— of the wrist in a child, Mr. Fagan's case of 122

PAGE.
Fagan, Mr. J., on diseases of the wrist, and case of excision in a child ... 122
Farquharson, Dr. R., on the use of arsenic in skin diseases 240
Feet, sweaty, Dr. Thin on the treatment of lxiii
Fever, Dr. Reiss on a constant bath treatment of xvii
——— puerperal, Dr. Matthews Duncan on 277
——— typhoid, Dr. Bakewell on the use of aconite in xviii
——— typhoid, Dr. Cayley on the antipyretic treatment of 1
——— typhoid, Dr. Rothe on the antiseptic treatment of... 9
Fibrinous polypus uteri, Dr. Matthews Duncan on 275
Fibroids, uterine, Mr. Jackson's case of spontaneous expulsion of ... 287
Fish as the one sole cause of leprosy, Mr. Hutchinson on 264
Flatulence, acidity and pyrosis, Drs. Ringer and Murrell on glycerine in ... 90
Forceps, Dr. Hamilton on the use of in labour 285
——— obstetric, Prof. Simpson's modification of 308
Fox, Mr. R. D., on the treatment of sprains 134
Fracture, compound, Dr. Brown on tinct. benzoin co. in 117

Gairdner, Dr. W. T., on Bright's disease, and the use of diuretic remedies... 99
Gangrene of the lung, Dr. M'Leod on the inhalation of carbolic acid in ... 60
Gill, Dr. J., on Chian turpentine in cancer of the breast 34
Gleet, Mr. Harrison on irrigation of the urethra for 201
Glycerine in flatulence, acidity, and pyrosis, Drs. Ringer and Murrell on ... 90
——— tonic, Dr. Larmande on, as a substitute for cod-liver oil ... lxxix
Gonorrhœa, Dr. Pasqua on hydrate of chloral injections in lxiv
Gonorrhœal ophthalmia, Dr. Gunn on the treatment of lxv
——— ophthalmia, Dr. Wolfe on the treatment of 229
——— ophthalmia, Dr. Theobald on boracic acid in lxix
——— ophthalmia, Mr. Bader's treatment of 230
Gould, Dr. A. P., on the radical cure of varicocele by the galvanic ecraseur 204
Gout, Dr. Thomas on the pathology of 41
Greenhow, Dr., on the salicylates in acute rheumatism 44
Gross, Dr. S. W., on the diagnosis of tumors of the mammary gland ... 301

Hall, Dr. J. C., his cases of lupus treated successfully by carbolic acid ... 262
Hamilton, Dr. G., on the use of the forceps 285
Harrison, Mr. R., on irrigation of the urethra for gleet 201
Heath, Mr. C., on Holt's immediate treatment of stricture 197
Hemophilia, Dr. Winter on two cases of 338
Hemorrhagic diathesis, Dr. Winter on the 342
Hemorrhoids, Dr. Bodenhamer's improved method of tying 167
———————Mr. Benham on the treatment by crushing 166
———————Mr. Pollock's treatment of by crushing 160
Hernia, congenital inguinal, Dr. Buchanan's operation for in a child ... 156
Homatropin, Mr. Tweedy on the mydriatic properties of lxix
Hot-water irrigation in menorrhagia, Dr. Matthews Duncan on 293
Hunt, Dr. J. W., on the use of ergot in diabetes mellitus 103
Hutchinson, Mr. J., on lupus and its treatment 253
——————————— on the etiology of true leprosy 263
Hydrobromic ether as an anæsthetic in labour, Dr. Turnbull on lxxi
——————————— or bromide of ethyl, Dr. Marion Sims on 324
Hyperpyrexia, Dr. Little's case of 18
——————————— Dr. Philipson's notes on a case of 13
Hysteria associated with amenorrhœa and intercostal neuralgia, Dr. Philipson's case of 13

India-rubber air or water pads for splints, Dr. Thompson on 133
Inhaler for ether anæsthesia, Mr. Richardson's india-rubber 327
Intestinal obstruction, Dr. Coats on twisting of the gut as a cause of ... 95
——————obstruction cured by colo-puncture, Dr. M'Gown's case ... 92
Intra-uterine puerperal coagula, Dr. Matthews Duncan on 272
Iodide of starch in lupus erythematodes, Dr. M'Call Anderson on ... 258
Irregular gout, Dr. Thomas on 41

PAGE.
Itch, Dr. Christison's treatment by chloride of lime lotion 252
—— Dr. McCall Anderson's treatment by styrax ointment 252
—— Dr. Sang on the diagnosis and treatment of... 249
—— Mr. Erasmus Wilson's treatment by sulphur ointment 252
—— M. Hardy's treatment by sulpho-alkaline ointment 252

Jackson, Mr. H. W., his case of spontaneous expulsion of large uterine fibroids 287
Joint diseases and injuries, Mr. Wood on double extension in 112
Joints, Editor of Lancet on aspiration of 121
——— Mr. Marsh on chronic affections of joints in children, and on excision 118
Jones, Prof. W., on operations for cataract by discission from behind ... 209

Kenyon, Mr. J. E., on Chian turpentine in cancer of the uterus 34
Knee-joint, Mr. Coppinger's splint for antiseptic excision of 110

Labour, Dr. Hamilton on the use of the forceps in 283
——— Dr. Turnbull on hydrobromic ether as an anæsthetic in... ... lxxi
Lane, Mr. J., on Holt's immediate method of treating stricture 199
Lawson, Mr. G., on sympathetic ophthalmia and its treatment 214
Leech, Dr. D. J., on citrate of caffein as a diuretic 345
Leeches, how to get to bite lxxviii
Leprosy, true, Mr. Hutchinson on the etiology of 263
Ligature of arteries in their continuity, Dr. Bæchel on catgut for ... xlviii
———— of hemorrhoidal tumours, Dr. Bodenhamer's improved method... 167
———— of the pedicle in ovariotomy, Mr. Knowsley Thornton on ... 297
Lister, Prof. J., on micro-organisms : their relation to disease 18
Lister's antiseptic dressings, short directions for li
Lister's antiseptic treatment—preparation and application of catgut ligatures 140
———————————antiseptic sutures 151
Lithotrity, Mr. Teevan on Bigelow's operation 173
Little, Dr. J., his case of extraordinary high temperatures 18
Lupus, Dr. Balmanno Squire on linear scarification in 260
——— Dr. Hall's cases treated successfully by carbolic acid 262
——— Mr. Hutchinson on the causes and varieties of 253
——— Mr. Hutchinson on the treatment of 257
——— erythematodes, Dr. M'Call Anderson on iodide of starch in ... 258
——— erythematosus, Mr. Hutchinson on 254
——— vulgaris, Mr. Hutchinson on 255

McCall Anderson, Dr., on the use of iodide of starch in lupus erythematodes 258
Macdonald, Mr. A. D., on menthol as an antiseptic and anti-neuralgic ... 331
Macewen, Dr. W., on the method of preparing paraffin splints 128
McGown, Dr. J., his case of intestinal obstruction cured by colo-puncture... 92
M'Keown, Dr. W. A., his treatment of relaxation of the membraua tympani 233
Macnamara, Mr. R., on Holt's plan of immediate treatment of stricture ... 198
Mamary tumors, Dr. Gross on the diagnosis of 301
Marsh, Mr. H., on the treatment of chronic inflammatory affections of the joints in children 118
Medication of nasal and other regions, Dr. Woakes's medicated wools for... xxiii
Membrana tympani, Dr. M'Keown on treatment of relaxation of the ... 233
Menorrhagia, Dr. Matthews Duncan on the treatment of... 292
Menthol as an antiseptic and antineuralgic, Mr. Macdonald on 331
Micro-organisms, Prof. Lister on their relation to disease 18
Migraine, Mr. Robson on nitro-glycerine in 344
Milk-curdling ferment, Dr. Roberts on 76
Morphia, subcutaneous injection of in asthma, Dr. Berkhart's cautions respecting 74
Multiple linear scarifier, Dr. Squire's, for the treatment of lupus ... 261
Munro, Dr. R., on inhalation of carbolic acid in respiratory affections ... 57
Murrell, Dr. W., on Dr. Drysdale's views on pyrexin or pyrogen 10
Mydriatic properties of homatropin, Mr. Tweedy on the... lxix

PAGE.
Nævus, Mr. Walker's case treated by sodium ethylate 239
——— Mr. Walker's case treated by the actual cautery 240
Nares, posterior, Dr. Spear's method of plugging the xxvii
Neuralgia, Mr. Macdonald on the use of menthol in 333
——— facial, Dr. Abbot on salicylic acid and salicylate of soda in ... xix
Neuralgic headache, Dr. More on nitrite of amyl in xix
Nictitation, Dr. Pearse on the use of belladonna in lxix
Nitrite of amyl in neuralgic headache, Dr. More on xix
Nitro-glycerine in migraine, asthma, and angina pectoris, Mr. Robson on... 344

Obstetric forceps, Prof. Simpson's modification of Sampson's 308
Oil silk, Dr. Keen's waterproof paper as a substitute for lxxx
Ophthalmia, gonorrhœal, Dr. Gunn on the treatment of lxv
——— gonorrhœal, Dr. Wolfe on the treatment of... 229
——— gonorrhœal, Mr. Bader's treatment of 230
——— neonatorum, Dr. Wolfe on the treatment of... 225
——— sympathetic, Mr. Lawson on 214
Opium, M. Pecholier on the uses of 327
Osborne, Mr. S., his annotations on anæsthetics 314
Ovariotomy, Dr. Thornton on the treatment of the pedicle in 293
Oxalate of cerium in cough, Dr. Cheesman on xxii
Ozœna, Mr. Lennox Brown on the treatment of xxiv

Pancreatic digestion of milk, Dr. Roberts on the... 82
Paraffin splints, Dr. Macewen on the mode of preparing 128
Pecholier, M., on the physiological and therapeutic aspects of opium ... 336
Pedicle, Dr. Knowsley Thornton on the treatment of in ovariotomy ... 293
Peptonised beef-tea, Dr. Roberts on the preparation of 86
——— gruel, Dr. Roberts on the preparation of 85
——— milk, Dr. Roberts on the preparation of 84
——— milk-gruel, Dr. Roberts on the preparation of 86
——— soups, jellies, and blancmanges, Dr. Roberts on 86
Philipson, Dr. G. H., his notes on a case of hyperpyrexia 13
Phlyctenular ulcers, Dr. Gunn on the treatment of lxviii
Phthisis, Dr. Cheesman on oxalate of cerium in the cough of xxiii
——— Dr. Neale on chloride of calcium in xxvi
——— pulmonalis, Dr. Monro on inhalation of carbolic acid in ... 57
Pilocarpin, Dr. Berkart on its use in asthma 63
Pitting after small-pox, Dr. Clark's method of preventing lxiii
——————————Dr. Schwimmer's method of preventing lxiii
Plugging the posterior nares, Dr. Spear's method of xxvii
Pneumonia, chronic, Dr. Berkart on subcutaneous injection of pilocarpin in... 71
Pollock, Mr. G., on the treatment of hemorrhoids by crushing 160
Polypus, uterine fibrous, Dr. Matthews Duncan on 275
Porte-vaccine case, Messrs. Salt and Son's 349
Pressure, continuous, in the treatment of sprains, Mr. Fox on 134
Prolapsus recti, M. Vidal's treatment of xxxii
Psoriasis, Dr. Farquharson on the use of liquor arsenicalis in 242
Puerperal coagula, intra-uterine, Dr. Matthews Duncan on 272
———fever, Dr. Matthews Duncan on 277
Purulent conjunctivitis, Dr. Wolfe on the treatment of 229
Pyæmia, or non-specific blood-poisoning, Mr. Duggan on 36
——— and septicæmia, Dr. Matthews Duncan on 281
Pyrexin or pyrogen, Dr. Drysdale and Dr. Murrell on 10

Quebracho, Dr. Berkart on the liquid extract of, in asthma 75

Ralfe, Dr. C. H., on dyspepsia associated with alkaline urine 87
Rectum, M. Vidal on subcutaneous injection of ergotine in prolapse of ... xxxii
Reiss, Dr., on a constant bath treatment of fever xvii
Relaxation of the membrana tympani, Dr. M'Keown's treatment of ... 233
Rheumatism, acute, Dr. Young on the use of the salicylates in 46
——————————Editor of Medical Times on the salicylates in ... 44

PAGE.
Richardson, Mr. B. W., his india-rubber inhaler for ether anæsthesia ... 327
Ringer and Murrell, Drs., on glycerine in flatulence, acidity, and pyrosis ... 90
Ringworm, Dr. Cottle on the use of croton oil and salicylic acid in ... 245
Roberts, Dr. W., on artificially-digested (peptonised) food... 82
——————— on digestive ferments 76
Robson, Mr. A. W. M., on nitro-glycerine in migraine, asthma, and angina pectoris 344
Rothe, Dr., on the antiseptic treatment of enteric fever 9
Rupture of the uterus, Mr. Sincock's case of 290

Salicylates in acute rheumatism, Dr. Greenhow on 44
——————— in acute rheumatism, Dr. Young on 46
——————— in acute rheumatism, Editor of Medical Times and Gazette on... 44
——————— in sciatica and neuralgia, Dr. Abbot on the xix
Salt & Son's inventions:—Dr. Dudgeon's Pocket-Sphygmograph 351
——————————— New Porte-Vaccine Case 349
——————————— New Urinary Test Case 350
——————————— Registered Urinary Microscope 352
Sang, Dr. W., on the diagnosis and treatment of scabies... 249
Sapræmia after labour, Dr. Matthews Duncan on the treatment of ... 279
Scabies, Dr. Sang on the diagnosis and treatment of 249
Sciatica, Dr. Abbot on salicylic acid and salicylate of soda in xix
Septicæmia, Mr. Duggan on 36
——————— and pyæmia, Dr. Matthews Duncan on 280
Sepsin and pyrexin, Dr. Drysdale on the preparation of 11
Simon, Mr. J., on operations for retention of urine dependent on stricture... 190
Simpson, Prof. A. R., his modification of Sampson's forceps 308
Sims, Dr. J. M., on bromide of ethyl, or hydrobromic ether 324
Sincock, Mr. J. B., his case of rupture of the uterus 290
Skin diseases, Dr. Farquharson on the use of arsenic in 240
Small-pox, Dr. Clark's method of preventing pitting lxiii
——————— Dr. Schwimmer's method of preventing pitting lxiii
——————— official introduction of vaccination with calf-lymph lxxix
Smith, Dr. A. A., on the treatment of convulsions in children 309
Smoking, Dr. Berry on central amblyopia from 220
Sodium ethylate, Mr. Walker's case of nævus cured by 239
Sphygmograph, Dr. Dudgeon's pocket 351
Spinal diseases and injuries, Mr. Wood on double extension in cases of ... 112
Splint for antiseptic excision of knee-joint, Mr. Coppinger's 110
Splints, Dr. Thompson on india-rubber air or water-pads for 133
———————for chronic affections of joints in childhood, Mr. Marsh on ... 118
———————paraffin, Dr. Macewen on the method of preparing 128
Sprains, Mr. Fox on the treatment of 134
Squire, Dr. B., on the treatment of lupus by linear scarification 260
Startin's mixture, Dr. Bulkeley on its use in cutaneous congestion ... lvii
Stitches in cleft palate operations, &c., Dr. Woakes's instrument for insertion of... 170
Stone in the bladder, Mr. Teevan on recent progress in the treatment of ... 172
Stricture of urethra, Mr. Harrison on the prevention of 201
——————— of urethra, Mr. Heath on the immediate treatment of 197
——————— of urethra, Mr. Lane on the immediate treatment of 199
——————— of urethra, Mr. Macnamara on the immediate treatment of ... 198
——————— of urethra, Mr. Simon on the modified perineal operation for ... 194
——————— of urethra, Mr. Simon on the treatment of 190
——————— of urethra, Sir H. Thompson on progress in the treatment of ... 180
Sub-involution of the uterus, Dr. J. Braithwaite on the treatment of .. 270
Sugar in urine, Dr. Ralfe on copper test capsules for detecting. xxxv
Sulphuric acid, Dr. Matthews Duncan on its use in menorrhagia 292
Surgical statistics, Editor of British Medical Journal on 137
Sutures, Dr. Beatson on antiseptic adhesive plaster as a substitute for ... 151
——————— carbolised catgut, Dr. Beatson on 155
——————— horse-hair, Dr. Beatson on 155
——————— silver-wire, Dr. Beatson on 151

PAGE.
Sweating of the feet, Dr. Thin on the use of boracic acid solution in ... lxiii
Sympathetic ophthalmia, Mr. Lawson on the treatment of 214
Syphilis, Dr. M'Call Anderson on iodide of starch in old-standing cases of... 259

Tapeworm, use of cus as a tænicide in xxxiii
Teevan, Mr. W. F., on the treatment of stone in the bladder 172
Thomas, Dr. W. R., on irregular gout and its pathology 41
Thompson, Dr. E. C., on air or water pads for splints 133
Thompson, Sir H., on progress in the treatment of stricture of the urethra... 183
Thornton, Dr. J. K., on the treatment of the pedicle in ovariotomy ... 293
Tinct. benzoin co. in compound fracture, Mr. Brown on 117
Tinea tondens, Dr. Cottle on the treatment of 245
Tobacco amblyopia, Dr. Berry on 219
Tonic glycerine as a substitute for cod-liver oil, Dr. Larmande on ... lxxix
Tuberculosis, Dr. Monro on inhalation of carbolic acid in 57
Tumors, encysted, Dr. Foster on removal without leaving any mark ... lvii
——— mammary, Dr. Gross on the diagnosis of 301
Tympanic membrane, Dr. M'Keown on the treatment of relaxed .. 233
Typhoid fever, Dr. Bakewell on the use of aconite in xviii
——————— Dr. Cayley on the antipyretic treatment of 1
——————— Dr. Rothe on the antiseptic treatment of 9

Ulceration of the cornea, Dr. Gunn on the treatment of lxviii
Urethral stricture, Sir H. Thompson on progress in the treatment of ... 180
Urinary microscope, Messrs. Salt and Son's "registered" 352
———test-case, Messrs. Salt and Son's new 350
Urine, Dr. Ralfe on alkalinity of, associated with a form of dyspepsia ... 87
——— Dr. Ralfe's copper test capsules for detecting sugar in xxxv
Urticaria, Dr. Bulkeley on the use of Startin's mixture in lvii
Uterine fibrinous polypus, Dr. Matthews Duncan on 275
———fibroids, Mr. Jackson's case of spontaneous expulsion of large ... 287
Uterus, Dr. J. Braithwaite on the treatment of sub-involution of ... 270
———Dr. Duncan on displacement and descent of lxxi
———Dr. Thornton on displacement and descent of lxxi
———Mr. Sincock's case of rupture of 290

Vaccination with calf-lymph, official introduction of lxxix
Varicocele, Dr. Gould on its radical cure by the galvanic ecraseur... ... 204
Vesicant collodion, Dr. Hisch on the preparation of lxxx

Walker, Mr. B., his treatment of nævus by sodium ethylate and the actual cautery 239
Waterproof surgical dressing paper, Dr. Keen's lxxx
Winter, Dr. W. H. T., on two cases of hemophilia 338
Woakes, Dr. E., his instrument for inserting stitches in cleft palate, &c. ... 170
Wolfe, Dr. J. R., on the treatment of ophthalmia neonatorum 225
Wood, Prof. J., on double extension in spinal and joint diseases and injuries 112
Wool-sorter's disease, Dr. Bell on 52
Wrist, Mr. Fagan on diseases of the, and case of excision 122

Young, Dr. C. G., on the salicylates in acute rheumatism 46

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